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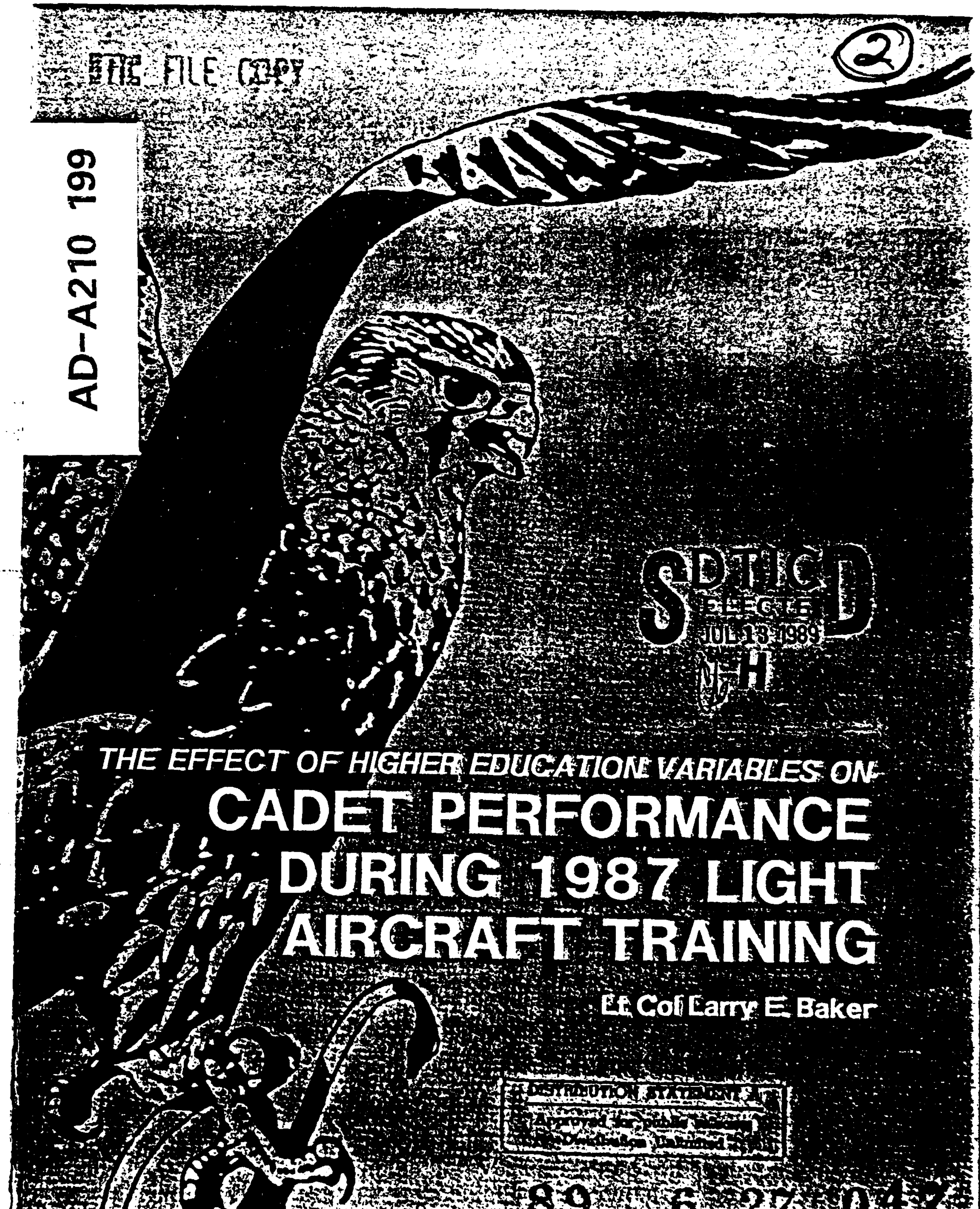

THE EFFECT OF HIGHER EDUCATION VARIABLES ON CADET PERFORMANCE DURING 1987 LIGHT AIRCRAFT TRAINING

Lt Col Larry E. Baker

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Research Report No. AU-ARI-88-9

THE EFFECT OF HIGHER EDUCATION VARIABLES ON CADET PERFORMANCE DURING 1987 LIGHT AIRCRAFT TRAINING

by

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CONTENTS

Chapter		Page
	DISCLAIMER	ii
	FOREWORD	v
	ABOUT THE AUTHOR	vii
	PREFACE	ix
1	RESEARCH DESIGN	1
	Need for the Study	1
	Statement of the Problem	3
	Null Hypothesis	4
	Assumptions	4
	Limitations	4
2	REVIEW OF LITERATURE	7
	Post-World War II to 1959	7
	1960-1969	9
	1970-1979	10
	1980 to Present	15
	Summation of Previous Research	17
	Variations between the Current Study and Past Efforts	18
3	METHODOLOGY	21
	Subjects	21
	Training Syllabus	23
	Ground Academics	24
	Flying Training	25
	Officership	28
	Possible Pitfalls	28
	Mission Grading Parameters	29
	Grading Scale	30
	Maneuver Item File	31
	Dependent Variables	33
	Pass or Fail	33
	Quantified Performance	34
	The Independent Variables	37
	Scholastic Aptitude Test Scores	37
	University Grade Point Average	37
	University Academic Major	38
	University Varsity Sports Competition	38
	Prior Flying Experience	38

Chapter		Page
	AFROTC Detachment	38
	Air Force Officer Qualifying Test	39
	AFROTC Quality Index Score	39
	Gender	39
	Statistical Analysis	39
4	RESULTS	41
	Analysis of Subject Demographics	41
	Dichotomous Variables	42
	Pass or Fail during the LATR Program	42
	Effect of Prior Flying Experience	42
	University Varsity Sports Competition	43
	Gender as a Variable	43
	Effect of Academic Majors	44
	Multivariant Analysis of Dependent Variables	44
	Summary of the Results	45
5	CONCLUSIONS AND RECOMMENDATIONS	47
	Prior Flying Experience	47
	Varsity College Athletics	48
	Air Force Officer Qualifying Test	49
	College Grade Point Average	50
	Curricular Variables Not Affecting Performance	50
	Academic Majors	50
	Scholastic Aptitude Test Scores	51
	Quality Index Score	51
	Gender	51
	Recommendations	52
	A Brief Summary of LATR 1987	53

ILLUSTRATIONS

Table		
1	Maneuver Item File	32
2	Independent and Dependent Variables	33
	APPENDIXES	55
	REFERENCES	261

FOREWORD

Lt Col Larry E. Baker examines a question of continuing interest to the Air Force and more specifically to the Air Force Reserve Officer Training Corps: Are we using the most appropriate standards for selecting young officers to be trained as pilots? Colonel Baker applies a scientific approach to studying the 1987 light aircraft training (LATR) program to determine which selection criteria have the most reliability as predictors of success in the LATR program and which likely would also have validity as predictors of success in undergraduate pilot training. His study indicates the need for continuing research in this area.

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Colonel Baker has a doctorate from Florida International University and holds master of science, master of arts, and bachelor of science degrees. He is a resident graduate of the Air War College. He has taught at the university level and is a past director of the Health and Fitness Institute, a sports medicine center in Coral Gables, Florida.

PREFACE

This research effort resulted from the Air Force Reserve's desire to enhance its selection of candidates for undergraduate pilot training (UPT). However, at the outset of this research, I relegated developing an accurate method to determine which applicants from the Reserve should attend UPT to the back burner. I quickly realized that the available data and prior research did not provide an accurate, meaningful formula for identifying which students would complete pilot training successfully and, thus, could not provide a sound basis for deciding which officers should be sent to UPT. Hence, I directed my research toward developing a research design that would supply some of the criteria that seemed to be lacking in the previous body of scientific studies. This research should supply some of the missing pieces to the puzzle of what makes a good Air Force pilot.

In designing this study, I sought to determine the extent to which the current criteria for selecting candidates for pilot training are valid as predictors of success in a flying training program. Toward this end, I limited the scope of the effort to producing precise, valid results that could withstand the rigorous tests required of scientific inquiry. Moreover, to enable replication of the study at a later date, I restricted the variables to data that was readily available from a subject's records or that was currently being used as discriminators in selecting individuals for UPT. The study of individual flying careers during and after UPT would produce the best results in deciding which traits most clearly indicate likely success as a pilot. However, because the time and money to track individual careers across the span of several years were not available, I had to develop an alternative research design.

The 1987 light aircraft training (LATR) program for Air Force Reserve Officer Training Corps cadets met several of the necessary criteria for a sound research design. The Air Force designed the LATR program to emulate UPT and to determine the student's potential for successfully completing a pilot training program. In addition, the selection criteria for LATR approximated the qualifying standards for UPT. Hence, I could treat the validity of using the LATR selection criteria as predictors of success in flight screening as emulating the validity of using the UPT selection standards as predictors of success in UPT. Moreover, the 1987 LATR had other advantages as a research design. It was a short program with little potential for the sociological conditioning that takes place in the rigid military environment of UPT, and it allowed excellent proce-dural controls.

The results show that many of the selection constructs developed to identify individuals that have the potential to become military pilots are probably incorrect. In addition to underscoring some important relationships between selection variables and flight performance, I demonstrate that some perceived relationships between variables were unjustified.

I chose to follow the formal academic and scientific research model to include a formal statement of the problem, formulation of the null hypothesis, and the statement of the specified methodology to give validity to the results. From the model, I derived the statistical procedures necessary to determine, within a definite range of probabilities, the statistical relationship between the selection variables for LATR and the flight performance of cadets as measured by the official pass-fail grade and a quantified indicator of cadet performance during the flight training. I used applications of the Statistical Package for Social Scientists-X (SPSS-X) to make the actual statistical analysis. The computer runs for these applications and the raw data sets are included in the appendixes for those who want to examine the results and the analysis in greater detail. Although this scientific approach may limit the readership somewhat, to adhere to a less strict protocol would reduce the accuracy of the findings--as has been the case in much of the previous research on the pilot selection problem. This analysis should stimulate reevaluation of the selection criteria for LATR and UPT.

Larry E Baker

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CHAPTER 1

RESEARCH DESIGN

The United States Air Force continually faces the problems of recruiting, educating, training, and retaining its pilot force. If the Air Force is to maintain a high level of operational ability, it must have a highly capable corps of pilot officers. To ensure that it has adequate numbers of skilled pilots, the Air Force initially must select gifted individuals for its undergraduate pilot training (UPT) program, the first step in becoming an active duty pilot.

This researcher focuses on the Air Force Reserve Officer Training Corps' (AFROTC) method of selecting candidates for its light aircraft training (LATR) program as the first step in deciding which AFROTC graduates will attend UPT. Current knowledge and data are inadequate as to what type of undergraduate curriculum and extracurricular activities will best enable a university student to pilot a supersonic aircraft with a high degree of skill within a year of graduation. This research design should increase that knowledge. Specifically, this researcher examines those traits that the AFROTC pilot candidate can relate most strongly to his or her success in completing the present Air Force preselection flight training and screening program--LATR.

Need for the Study

Most research on the selection process has attempted to correlate selection criteria (input variables) with success in UPT. This relationship may appear logical at first glance since the selection of candidates who can complete training is the stated objective of the pilot selection process. Given the current selection criteria for UPT, one may conclude that Air Force ROTC has based its selection process on the assumption that students in specific academic majors make superior aviators. The allocation of 80 percent of the AFROTC scholarships to engineering majors is indicative of this bias. If the only objective of the screening process is to identify piloting skills, then AFROTC has not examined current selection criteria such as a high grade point average, excellent Scholastic Aptitude Test (SAT) scores, and top scores on the different phases of the Air Force Officer Qualifying Test (AFOQT) with the rigor necessary to justify their use as primary selection criteria. Likewise AFROTC has not analyzed its bias toward engineering students sufficiently to determine if engineers do indeed do better as pilot trainees. This rationale obscures the fact that the overall objective should be to develop and train the most skilled pilots possible, not just to graduate individuals from LATR or UPT. The environment of UPT may self-select specific educational variables that do not necessarily correlate with high skill levels at a point later in the officer's flying career.

One of the issues that may cloud the UPT selection process is screening applicants not only for piloting skills but also for other traits that the Air Force finds desirable in its officer corps. These other indicators, while not at cross-purposes, may dilute pure piloting traits and characteristics among the selected student aviators.

In this study, the researcher examines specific higher education curricular variables--course of study, varsity athletic competition, prior flying experience, and gender--in relationship to their effect on performance by AFROTC cadets during the LATR program. The intense 16-day flight screening LATR program is the last step for AFROTC students, other than successful completion of the bachelor's degree and commissioning, that leads to UPT. The objective of the light aircraft training program is to determine if a candidate has the potential to complete Air Force undergraduate pilot training. Due to the short duration of LATR, the cadets are not subject to the effects of the intense sociological conditioning experienced during undergraduate pilot training. Hence, innate flying ability may be less difficult to determine during LATR than in UPT, when sociological indoctrination has developed as a potentially more significant factor.

Despite the fact that AFROTC uses exacting eligibility requirements in choosing cadets for flight screening and training, the failure rate of these cadets during the flight screening program (as it has been referred to in the past years) or LATR (the 1987 title) has held at 30 percent. Moreover, the failure rate for AFROTC graduates at UPT runs close to 40 percent. Each UPT attrition represents a lost investment of $70,000. Reducing the attrition rate by developing a selection strategy that would accurately predict which AFROTC students would be successful during UPT could save large sums in the Air Force budget.

The overall effect of the failure rate during pilot training may be even more significant when one considers factors other than just funding. Many of the young officers who do not finish UPT stay in the Air Force and complete their careers in fields that they consider second best. To what extent this feeling may influence operational efficiency is subject to debate; however, not to acknowledge this possible negative emotion among a significant faction of the Air Force officer corps may be an error. A high UPT attrition rate can only add to this problem.

If time and money were not a factor, this research question could be developed into a pure experimental design, with random selection and control groups of nonflying cadets. However, to select individuals at random from the general college population and then attempt to motivate them to undergo a project such as the LATR program would not be feasible or rational. Perhaps a pure sample of flying talent in reference to academic performance could be established. However, if the randomly selected subjects were not inclined toward a career in military aviation, then the effort would be less than satisfactory. The subjects included in this study have been selected by AFROTC to compete for a spot in undergraduate pilot training. The selection process for the subjects in this study would seem to meet the need of the research objective.

The results of this research should provide data and support for refining the criteria used in selecting AFROTC students for training as Air Force pilots. The use of refined selection criteria would reduce attrition during UPT, thus resulting in more efficient use of expenditures. Improved identification of flying abilities among AFROTC cadets could enhance the ability of the Air Force to complete its assigned mission.

Statement of the Problem

The United States Air Force has experienced a high rate of attrition among AFROTC graduates during UPT. One of the possible methods of reducing this attrition rate is to develop a superior method of selecting AFROTC student pilots for undergraduate flight training. This researcher approaches this problem by focusing on higher educational curricular characteristics of AFROTC officer candidates competing in the LATR program for an assignment to undergraduate pilot training.

Specifically the researcher attempts to determine the relationship of these selected variables to the overall performance of the AFROTC cadets who took part in the light aircraft training at Embry-Riddle Aeronautical University, Daytona Beach, Florida, in the summer of 1987. Knowledge gained by examination of the selected subject's performance in relationship to existing educational variables may assist in developing a more precise method of selecting student pilots and may lead to a reduction in the high rate of UPT attrition.

Null Hypothesis

There is no relationship between the specified higher educational curricular variables and the performance of Air Force Reserve Officer Training Corps cadets during the 1987 light aircraft training program for AFROTC conducted at Embry-Riddle Aeronautical University.

Assumptions

The researcher bases his research design on the following assumptions.

1. For this study to have any operational value, the results should apply to future AFROTC cadet groups. This condition requires a similar symmetrical population, as is the case. The pool of AFROTC cadets selected for undergraduate pilot training and flight screening has remained very consistent throughout the years as to the independent variables that are the focus of this study. Relationships between variables derived from 1987 LATR data are assumed to apply to future cadet groups.

2. The 1987 LATR cadets constitute the entire population; hence, random selection is not an issue.

3. The treatment received by each cadet is identical. Variations in teaching skills, in weather during check rides, and in performance of individual aircraft during stalls and other maneuvers do exist, but these variances are of insufficient magnitude to cause a significant difference in the performance of the subjects.

Limitations

Time, money, and subjects with which to develop a classic experimental design are not available.

1. Random selection and control groups to probe the question of specific traits and curricular variables in reference to flying skills and ability are not a viable option. Examining the problem with subjects that have been preselected may limit the explanatory potential of this research design.

2. Time limited this study to just the 1987 LATR classes. The time necessary to track the cadets during the last one or two years of college, the year-long period of undergraduate pilot training, and advanced flying training was not available. Following the professional flying development of all cadets until they reach full operational flying status as active duty pilots would provide highly relevant information.

CHAPTER 2

REVIEW OF LITERATURE

Researchers who have studied the subject of selection of students for flying training have examined psychological or personality variables, have attempted to determine which physiological attributes relate to flying skills, or have conducted basic research into the quantification of flying skills. These researchers have used various test instruments including pen-and-paper tests developed by the military, standard psychological tests, and computer-driven simulator devices.

None of the researchers have examined the specific subject of the present research study--examining the relevance of using higher educational curricular variables as quantified predictors of performance during military light aircraft flight screening. A few have examined curricular variables in relationship to undergraduate pilot training with negative results. Nonetheless, the research studies reviewed here do have in common with the current study a long-range interest in developing selection criteria for military flight training that will be predictive of success in both pilot training and active duty pilot status. Research prior to and during World War II is not of apparent value as it tended not to relate to the current problem or was not documented in a scientific manner. No effort is made to describe the evolution of the pilot selection process, only to review the sound research that may reflect on this current investigation.

Post-World War II to 1959

Between World War II and 1960, researchers directed their efforts at attempting to correlate existing personality traits with success as an aviator. The watershed research project was undertaken by the Army Air Fcrces Aviation Psychology Program in 1947. This project examined 23 tests in an attempt to validate personality traits as predictors of student pilot success. None of the tests provided predictive validity in reference to pilot performance (Guilford 1947).

J. R. Berry analyzed the Cornell Word Form (Weider et al. 1945) for use as a predictive instrument for screening pilots and found a slight relationship with success in aviation training (Berry 1954). Berry found some significance in this relationship; however, the small subject sample limited the validity of the study.

R. S. Melton administered the Minnesota Multiphasic Personality Inventory (MMPI) to naval aviators in an attempt to evaluate the personality characteristics of successful fliers (Melton 1954). The study showed some relationships between hysteria, masculinity-femininity, and mania; but Melton had limited success in predicting pass or fail of Navy cadets using the MMPI.

In 1956 S. B. Sells examined more than 100 personality tests in relationship to pilot selection. Sells concluded that factors such as test-taking skills and motivation skewed the results of such testing and that an evaluation of the first series of flights a student made were far more reliable predictors of success (Sells 1956).

In another 1956 study, the US Naval School of Aviation Medicine at Pensacola, Florida, sought to determine the validity of using personality inventories in the naval aviation selection program. The Navy concluded that tests developed to determine specific personality traits were not effective in determining success as a naval aviator. The rationale for the lack of success was that the personality tests are designed to detect psychological variations and are not directed toward performance variations (Voas et al. 1956).

D. K. Trites and A. L. Kubala searched for a relationship between the results of the Cornell Word Form (CWF) and flying performance. They examined Air Force pilots and were able to establish a relationship between specific traits on the CWF and traits exhibited by Air Force pilots (Trites and Kubala 1957). However, the research was directed at established aviators and would not indicate a predictive relationship among student aviators.

S. C. Fulkerson evaluated military aviators using the MMPI (Fulkerson 1958). He reported that five areas of the test permitted the discriminating of pilots from the normal population.

The research during this period focused on evaluating military aviators in reference to standard psychological tests in an attempt to identify a personality type that would enable selection of candidates with similar traits. This rationale may be defective in that the selective pressure of military aviation and the resulting role playing of the individuals involved may screen the actual personality.

1960-1969

In 1962 C. Mullins attempted to resolve the problem that personality types and role playing may affect the results of the test instrument. He devised a test that required the subject to identify which of two fields of dots contained a specific number of dots and which of the two dot fields contained more dots. The hypothesis was that the individual who could sort this information in the least time would prove to be less compulsive. The level of compulsiveness would relate to flying proficiency (Mullins 1962).

In 1963 L. R. Green used the Eysenck Personality Inventory to conduct an exploratory investigation of the relationship between personality measures and voluntary resignation from naval flight training at the US Naval School of Aviation Medicine (Green 1963). Green determined that no significant differences existed between student pilots who completed training and those who self-eliminated.

F. E. Peterson used the Edwards Personal Preference Scale (EPPS) (Edwards 1959) to determine if a relationship existed between success in naval flight and personality (Peterson 1965). This research determined that the EPPS was not effective in predicting success during flying training.

R. K. Ambler attempted to establish a relationship between success during Navy flight training and student pilot carefulness established by peer rankings (Ambler 1966). This peer-rating system did not develop significant relationships that would make development of effective preselection criteria for student pilots possible.

During 1966 the Navy sought to determine if a vehicular trainer would prove successful in predicting success in naval aviation training (Askren 1966). Results proved inconclusive; however, this study could be considered the first of many attempts to develop a quantified system of evaluating student pilots based on physiological motor skills.

Personality traits were again examined in relationship to success in naval aviation training. A team lead by H. L. Fleischman examined five personality scales in an attempt to determine if a relationship existed between a specific profile and success in military aviation (Fleischman et al. 1969). The Taylor Manifest Anxiety Scale showed a significant relationship between both pass or fail outcomes and self-elimination. The other instruments proved unrelated to performance in flight training.

The 1960 to 1969 time frame was most significant when considering the developing trends in research. The focus of the research in pilot selection was the student pilot, not the qualified aviator. In addition, researchers made the first attempts to quantify and evaluate the actual requirements of piloting skill. This trend continued into the next decade.

1970-1979

C. L. Hulin and K. M. Alvares assumed that Air Force selection tests do not predict success as a pilot. They then attempted to develop a research protocol that would explain the lack of predictive success (Hulin and Alvares 1970). In their study they evaluated three possible explanations of the temporal decay in predicting pilot proficiency. The results were not conclusive in predicting a level of flight proficiency.

The Royal Air Force commissioned a research study by A. B. Goorney to establish a correlation and method of analysis for determining if the military aircrew population differed from the British population at large. This study examined both pilots and navigators using the MMPI and the Maudsley Personality Inventory (Goorney 1970).

In another British study done in 1971, researchers used the Eysenck Personality Inventory in an attempt to develop a relationship between personality traits and success as a student pilot within the Royal Air Force. This study showed that the neurotic-introvert quadrant produced the largest amount of failures among the student pilot population; the stable-introvert quadrant had a much greater success rate (Jessup 1971).

R. E. Doll explored the relationship between vocational interest and success in flight training by administering the Strong Vocational Interest Blank test instrument to a group of Navy flight students and analyzing pass or fail performance during the course of the study (Doll 1972). This study determined that subjects who completed Navy flight training had a high interest in math and science. Critics of this study have pointed to the bias built into the results because the Navy's selection criteria for aviation students are weighted in favor of math and science.

One of the most promising psychological testing procedures used to predict success in aviation training was the Defense Mechanism Test developed in 1961 in Sweden by U. Kragh. T. Neuman conducted a comprehensive research study in an attempt to validate this test with the pass or fail criteria of military flight schools (Neuman 1972). The results of the study were inconclusive. However, the Swedish air force did elect to make the Defence Mechanism Test part of its selection process for undergraduate pilot training.

S. F. Bucky and S. L. Ridley gave the California Psychological Inventory to a group of naval flight students with hopes of establishing a relationship between specific profiles and success (Bucky and Ridley 1972). More than 300 students took the test. The researchers tracked the students' performances in the training program and found that the profiles of students who passed the training and those who failed were almost identical.

Bucky also approached the issue of success in aviation training by studying the relationship of aviation students and perceived levels of optimism, relevance, and importance. A questionnaire was administered to measure these specific attributes. Individuals who self-eliminated from the flying training displayed significant differences in the level of perceived importance they attached to flying training and were less optimistic than subjects who finished the course of training (Bucky and Burd 1973).

During this same time frame, Bucky researched the relationship between state and trait anxiety in voluntary withdrawal of Navy student pilots (Bucky and Spielberger 1973). The researchers administered the State-Trait Anxiety Inventory to more than 300 subjects who were to attend flying training. The study showed that students who displayed high levels of anxiety attrited at a rate significantly greater than students who scored low on the anxiety scale.

In 1973 P. A. Knoop developed an advanced simulation research system that made practical research experiments to quantify piloting skills and to establish specific qualifications and parameters for training proficiency (Knoop 1973). This effort provided a focus for later studies.

C. E. Billings followed with another study aimed at quantifying pilot performance with the objective of validating performance measures for rotary-wing aircraft (Billings 1973). Using an aircraft wired with a computer recording device to capture various flight and aircraft functions, Billings found that pilot skill could be determined by analyzing the variability of the aircraft rotor revolutions per minute.

W. L. Waag and associates examined the use of confidential instructor ratings at the Naval Aerospace Medical Laboratory for reliability in predicting success in naval undergraduate pilot training (Waag et al. 1973). They determined that these confidential ratings were a significant factor in predicting success or failure during pilot training and recommended that the Navy implement these ratings during the presolo stage as a permanent protocol.

The US Air Force elected in 1974 to employ the pen-and-paper psychomotor tests in the selection of candidates for undergraduate pilot training. The protocol was validated and has been in service, with revisions, to the present (McGrevy and Valentine 1974). Since the Air Force Officer Qualifying Test (AFOQT) has shown small but significant relationships to the success rate at UPT and since AFOQT scores are used as part of the selection criteria for LATR, the latest version will be used in the present research as part of the independent variables.

Using the Strong Vocational Interest Blank test, D. W. Robertson examined the relationship of vocational interest to success in flight training. The results displayed no validity in relationship to predicting levels of performance. The major problem in the study was that prior-selection procedures and criteria biased the results in that the sample of unsuccessful student pilots was similar in vocational interest to the sample of student pilots who successfully completed flight training (Robertson 1975).

Advances in computer technology during the 1970s allowed the development of apparatus-based psychomotor evaluation (Long and Varney 1975). Further improvements in this type of testing led to the use of computer-driven protocols in the 1980s. Although early results were not conclusive, the method of employing a computer-driven instrument showed promise.

A Canadian study explored the personality profiles of different populations within the Canadian military and established a relationship between specific profiles and military positions (Skinner et al. 1976). The research did not provide a predictive relationship in reference to flight training.

The US Air Force also explored the relationship between the Strong Vocational Interest Blank test and success in flight training and developed the same problems as had the Navy in Robertson's earlier research with a similar protocol (Guinn et al. 1976). Again prior selection screened the subjects and biased the results. The relationships were stronger when predicting who would not complete the training but were weaker in projecting success in flight training.

The School of Engineering, Air Force Institute of Technology, Wright-Patterson AFB, Ohio, directed studies into quantifying performance on flight simulators to evaluate their effectiveness. The purpose of the research was to identify criterion variables most applicable to initial flight simulation and to establish any differences between flight simulations and actual flight (Miller 1976). The data collected from research of this type may prove helpful in the future in establishing specific quantified parameters for measuring pilot performance in a training situation.

B. A. Smith, B. K. Water, and B. J. Edward studied performance on a T-37 aircraft simulator in an attempt to design a cognitive pretraining instructional package to help student pilots master overhead traffic pattern skills in the T-37 jet trainer (Smith, Water, and Edward 1975). They used a multimedia package to help develop the specific skill. They exposed an experimental group to the instruction package and put additional subjects in a control group. The experimental group was able to grasp the necessary skill in the overhead flying task in less time than the control group. Smith, Water, and Edward recommended that the cognitive pretraining package be implemented as part of the flight curriculum. Of primary interest here is their method of quantifying performance.

P. A. Irish and others studied the effects of system and environmental factors upon performance by experienced pilots on advanced simulators (Irish et at. 1977). Irish and his associates measured pilot behavior on various aspects of the flight envelope in an advanced simulator to determine the independent variables for the various maneuvers. The study advanced understanding of the quantification of the flight process.

G. S. Krahenbuhl, J. R. Marett, and N. W. King used the State-Trait Anxiety Inventory to evaluate the performance of T-37 student pilots in Air Force undergraduate pilot training. He determined that students who were considered inferior pilots perceived greater stress during the training program than did students who were doing well (Krahenbuhl, Marett, and King, 1976). The results of this study are rather logical as poor performance should produce high levels of anxiety in subjects who fear elimination from flight school.

In 1978 a team at the US Air Force Human Resources Laboratory validated the relationship between psychomotor skills and success at Air Force flight training (Hunter et al. 1978). This study proved significant as it created interest in establishing further research in developing a computer-driven method of evaluating potential flying skill levels.

A Swedish study revisited the Defence Mechanism Test in an attempt to quantify and validate the screening test in relationship to actual pilot performance (Neuman 1978). The validation was successful and the testing procedure is being employed in Sweden at the current time. Problems exist, however, in regard to using the test in the United States military system because of the requirements necessary to administer the test and the variation in the subject population.

The Federal Aviation Administration (FAA) analyzed the psychophysiological effects of aging within a pilot population. The study analyzed and quantified pilot performance, both successful and unsuccessful, and identified 14 factors as being related to success or failure in flying (Gerathewohl 1978).

R. G. Griffin and J. A. Hopson administered the Omnibus Personality Inventory (Heist and Yonge 1969) to flight students in an attempt to establish a relationship between success or failure in training and the test profile. The results were negative when examining for predictive use in the flight screening protocol (Griffin and Hopson 1978).

A research study completed in the late 1970s attempted to establish the effect of pretraining criterion on flight-simulator performance. US Air Force Academy cadets were tasked with specific parameters in a flight simulator while exposed to different levels of cognitive difficulty (Nataupsky et al. 1979). The results indicated that pretraining was significantly important when complex psychomotor tasks are required.

Research in the 1970s continued the trend toward computer psychomotor evaluation. The use of flight simulators in research evaluation and quantification was increasing at a great rate. The focus of the standard psychological tests was toward that of the student pilot, not the experienced aviator. Although many studies were developed, the ability to predict which pilot candidates would be successful remained slight.

1980 to Present

In a 1980 study, J. B. Joaquin used the Personality Research Form (Jackson 1974) as a method of predicting success during Canadian undergraduate pilot training (Joaquin 1980). Joaquin concluded that students with high interpersonal and leadership traits and a high degree of instrumental aggressiveness were successful in the flying training program. Student pilots with low scores in the above categories were more prone to failure.

A French study, completed in 1980, examined the developmental potential and limits to psychological screening of aviation personnel (Bremond 1982). J. Bremond discussed the problem of forming a standard protocol to determine the psychological fitness of pilot candidates. The research explored the relationships between pilot aptitude and success in various flight training programs. This five-year study showed no relationship between actual performance and that predicted by standard tests. Long-term monitoring of pilots to verify any testing protocol is recommended but would be expensive and time-consuming.

The Navy conducted a preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training. This study showed promising results (Griffin and Mosko 1982). Military pilots must be able to divide their attention among several tasks concurrently and many of these tasks are auditory. This research established the ability of student pilots to divide attention and this attention was quantified. The subjects were then tracked through pilot training and the success of the student pilot was compared to the ability to perform dichotic listening tasks. This study found a positive relationship between students displaying high ability in dichotic listening and success at flight training.

W. C. McDaniel and others examined the problems of when or if to wash out a student pilot from flight training. They compared the utility of a computer-aided training device for evaluating and scheduling students for further training to human evaluation and decisionmaking in regards to student progress (McDaniel et al. 1982). The study indicated that the computer assessment of student progress showed promise and should undergo further development and evaluation.

In an attempt to establish a quantified performance criteria for specific flying skills, researchers linked a computer-driven recording device to a flight simulator and sampled various flight parameters throughout the test flight (Demaio et al. 1983). The research concentrated on reducing and simplifying the large amount of data resulting from this system to meaningful parameters, with a hope of establishing precise quantified flying performance. A similar study at the USAF Test Pilot School, Edwards AFB, California, sought to measure flight parameters (Melody et al. 1983).

The FAA used a contrasting approach to study the problem of quantifying performance in aviation. A simulator was linked to a computer that sampled flight parameters throughout the mission during which the pilot experienced several simulated emergencies and various levels-of-clearance difficulty (Stein & Rosenberg 1983). The pilots were asked after the flight to rank the levels of stress and performance work load perceived during the flight. They were able to code the level of difficulty with accuracy.

G. B. Thomas and R. W. Clipper sought to determine the level of consistency between performance on a perceptual-motor task and a pen-and-paper achievement motivational test among Navy flight students (Thomas and Clipper 1983). Results indicated that a relationship existed. A particular-choice RT paradigm repeatedly resulted in correlations of 0.43 to 0.69 ($\underline{p} < 0.05$) between consistent task performance and measures of achievement motivation, and the test-retest reliability of the consistency measures was on the order of 0.70. This relationship was the only one established by the study. Further research was recommended to establish and refine this relationship with the intent of developing a pilot selection instrument with achievement as a component.

H. Wichman and J. Ball administered the Rotter Locus of Control Scale (Rotter 1966) to a group of FAA-certified flight instructors in 1983 in an attempt to establish differences between this group of subjects and the general population. Significant variations occurred in levels of internal perception (Wichman and Ball 1983). This study would not provide insight to preselection criteria as the subjects were all qualified pilots. The variations from the general population may result as an effect of the social process of aviation training. A similar study in Australia (Ashman and Tefler 1983) using Royal Australian Air Force pilots also detected differences in the pilot sample from the normal population with the Edwards Personal Preference Scale (Edwards 1959).

A study by the Air Force Reserve Officer Training Corps focused on background variables in a cadet's record that may affect a cadet's success at undergraduate pilot that may affect a cadet's success at undergraduate pilot training (Diehl 1986). The study examined 32 variables in reference to undergraduate pilot training success or failure. No relationships of significance were established that would enable effective use as a predictive device in reference to undergraduate pilot training. Four proved to be statistically significant. However, the impact was less than three percent. The pilot section of the AFOQT resulted in explaining 2.71 percent and was the best predictor, but it was not useful in reality.

Recent investigation of pilot selection has focused on the basic attributes test (BAT) system, an Air Force computer-based battery of tests designed to enable quantifiable selection criteria for undergraduate pilot training. This system assesses psychomotor skills and a variety of psychological and cognitive attributes. All tests are contained in a computer-program run. The system is complete with visual display and stick and rudder pedals (Carretta 1987). The various tests contained within the computer program have been validated with a degree of promise (Kantor and Bordelon 1985; Bordelon and Kantor 1986). The USAF Human Resources Laboratory, Brooks AFB, Texas, is attempting to establish variations in specific aircraft abilities, differentiating between high performance, fighter aircraft, and other aircraft assignments (Carretta 1987). This research may prove highly significant in developing and refining the pilot selection criteria.

The research conducted in the 1980s has focused on the student pilot as the subject of investigation with the emphasis on identifying traits within the subject population that would differentiate individuals on a preselection basis into pass or fail groups. Personality was augmented with physiological attributes as the primary selection criteria under investigation. The significance of computer testing--for example, the Air Force basic attributes testing--has been expanded greatly during the last few years.

Summation of Previous Research

Research since World War II has been characterized by an evolution of the primary focus of research from attempting to differentiate aviators from the normal population to attempting to predict which members of the general population would develop into successful aviators. The methodology also evolved from primarily employing a pen-and-paper test to develop psychological profiles into searching for psychological variations with a computer-driven test device.

The research has established that individuals who are military pilots do deviate from the normal population in psychological parameters. This knowledge is of limited value, however, as the very process of military flight training and socialization may produce this variation in psychological profile. The effects of role playing among military aviators and pilots in general make it quite difficult to test for preexisting psychological characteristics that would assist in selecting military aviators.

The research on quantifying flight performance may not provide relevant information in regard to determining which individual will develop into a skilled aviator. Most computer-driven simulator tests evaluate how well the subject adheres to an established flight profile. An ability to fly by the numbers may not be the necessary trait that pilots must display to meet real-world military aviation requirements. Specifically in high-performance fighter aircraft, when situation awareness in a multidimensional arena becomes the desired goal, the ability for mental creativity and divided focus are primary. This skill may be considered an art form rather than a task-orientated parameter that can be evaluated by precise quantification of performance.

Most research examined the process of flight training from a viewpoint of pass or fail criteria. This variable may be the correct dependent variable. However, in light of the many factors that affect the success of a student military aviator, some effort should be expended on attempting to quantify performance during flight training. A focus on overall student performance may prove informative in relationship to student characteristics and background variables. The subject of pilot selection for military aircraft needs additional systematic research if a system of evaluation is to be established that will precisely identify individual volunteers for military flight training who have a high probability of developing into skilled professional aviators.

Variations between the Current Study and Past Efforts

This study varies from past research in several aspects. The dependent variables include a quantified performance evaluation that reflects the subject's overall potential for flying and the pass or fail criterion of previous studies. Regressing the independent variables with this level of performance during the program may improve the reliability of criteria used in selecting individuals to attend flight training.

Past studies have focused on tests specifically derived to evaluate psychological profiles or ones that have been developed to screen for flying potential. The relationship between traits in the subject's background have not been subjected to the same level of interest. The independent variables used in this research design focus on the subject's educational experiences. Scholastic Aptitude Test scores, university grade point average, flying experience, athletic experience, academic major, and the various test scores and ranking systems developed by the Air Force for the subjects of the treatment are examined in relationship to success during the LATR program.

The primary variation in this study and previous work, however, is the difference in the treatment. Past studies have examined individuals who were already qualified pilots or they have compared results of various undergraduate pilot training efforts. This study examines the flying skills of a subject population which has yet to undergo the stress and possible personality modification of undergraduate pilot training. The treatment of the light aircraft training program--civilian instructors, light aircraft, and short duration of training--should not provide the opportunity for possible modification of individual traits as may undergraduate pilot training. Thus, the relationship between selected variables and the performance of the subjects may be more indicative of actual innate flying skills than undergraduate pilot training with its potential overload of modifying influences.

This researcher considers problems basic to the selection criteria currently in use and should reinforce previous studies if the trends found in undergraduate pilot training are continued or amplified when employing the LATR program as a treatment. The results may then be compared to the previous results of UPT studies.

CHAPTER 3

METHODOLOGY

The procedures and specific parameters used in the study were determined by the necessity of staying within the guidelines specified in US Air Force training manuals, operational technical data, and regulations and by the contract with the civilian flight training school, Embry-Riddle Aeronautical University at Daytona Beach, Florida. Although the light aircraft training (LATR) syllabus served as a defined protocol, this researcher has stated the LATR syllabus as if it had been designed for this study in order to more nearly approximate a true research design.

In this study, the researcher has quantified and evaluated specific variables in the higher education experiences of the selected subjects (Air Force ROTC cadets)--academic major, Scholastic Aptitude Test scores, grade point average, scores on the Air Force Officer Qualifying Test (AFOQT), gender, quality index score, AFROTC detachment, varsity athletics, and previous flying experience. The procedures and protocol were derived from the prior efforts of the Air Force and every effort is made to provide complete documentation. The researcher has paraphrased manuals or other documents for the purpose of clarity. The researcher has no intent to claim authorship of the LATR protocol, only to expand or amplify the procedures to facilitate understanding of the research design. The researcher has given full credit and responsibility for the LATR program to the Air Force.

Subjects

The subjects were all AFROTC cadets who were attempting to qualify for undergraduate pilot training as the first step in trying to become Air Force pilots. They were university students who had achieved junior or senior class standing for the following fall term and were attending school at one of the 152 colleges and universities that have AFROTC detachments. They attended light aircraft training for ROTC at Embry-Riddle Aeronautical University from 20 May to 19 August 1987 in three classes. The first class arrived on site 20 May 1987 and completed training 22 June 1987. The second class began 21 June 1987 and finished on 22 July 1987. The last class started on 20 July 1987 and ended on 19 August 1987.

The competition for the LATR positions as the first step in qualifying for undergraduate pilot training (UPT) among AFROTC cadets is intense, with AFROTC selecting the individuals it considers most highly qualified. The actual standards or scores on the various selection instruments change yearly depending on the need for new pilots. AFROTC Regulation 45-13, Weighted Professional Officer Course Selection System, outlines the selection process. Based on this researcher's observations the subjects seemed well motivated and eager to complete the training program. That the subjects performed to the maximum of their ability seems highly probable.

The subjects had to meet the minimum medical standards specified in Air Force Regulation 160-43, Medical Examination and Medical Standards, chapters 7 and 8. Any physical or mental abnormality or defect was grounds for rejection. Subjects had to have 20/20 vision not corrected. Specific aspects of their medical history--for example, motion sickness after the age of 12--might be cause for rejection.

While participating in the LATR program the students were provided with living accommodations that met the Air Force standard as specified in the contract between the Air Force and Embry-Riddle Aeronautical University (ERAU USAF-ATC 1987). Each cadet received at least 90 square feet of living space in a permanent dormitory. Each room was kept between 68 and 78 degrees. Power, lights, water, and other necessary accommodations such as bedding and closet space were available as specified in the contract. The dormitories at the university were used since they were vacant during the summer term.

The contractor also provided meals for the cadets in the university dining hall. The cadet's diet included three meals a day of no less than 3,200 calories, the composition of which was delineated in the contract. This controlled diet provided adequate nutrition and reduced the likelihood that variations in nutritional intake would influence the results of the flying program.

The length of the cadet's duty day was controlled. The work day was restricted to a maximum of 12 hours. Each cadet received a minimum of 12 hours of rest time prior to each duty flying period. Provisions for eight hours of uninterrupted sleep were programmed into the rest period. This protocol was identical to the one used at undergraduate pilot training. Cadets were organized into divisions defined as flights. Each of the classes was formed into six flights. Throughout the training and evaluation, the cadets attended class, ate meals, performed physical exercise, and reported to the flight line in these subgroups.

Random selection of subjects was not an issue in this research design. From a viewpoint of validity, the population--all the AFROTC cadets attending light aircraft training at Embry-Riddle Aeronautical University--was sampled. Selection of a randomized sample was not possible due to the contract between the Air Force and Embry-Riddle. Moreover, random selection of subjects from the population at large was not practical because of the extreme cost and because only a select few AFROTC cadets (those meeting minimum qualifications) were even eligible for consideration as potential subjects.

Training Syllabus

The Air Force developed LATR as a way to screen undergraduate AFROTC cadets for pilot training. The purpose of the light aircraft training syllabus was to "identify those participants who have the basic aptitude to become Air Force pilots and minimize attrition in undergraduate pilot training (UPT)" and motivate them to pursue a career as a rated officer in the Air Force. (ATC syllabus S-V8A-C, 1)

The written flight training syllabus has been continually changing since 1956 when Public Law 84-879 authorized the flight instruction program, AFROTC's original training flight screening program. The flight instruction program (FIP), which had similar objectives to the current program, remained in effect until 1984 when it was replaced by the flight screening program (FSP). This change was a response to the increase in UPT attrition among AFROTC graduates. The Air Force felt that the students could profit from an earlier exposure to military flying operations; FIP had been taught primarily by civilians with civilian procedures and techniques. The flight screening program was replaced in June 1987 by the light aircraft training program. The current research focused on this latest derivation.

Although actual flying requirements have not changed significantly, the philosophy has changed. During FIP the mind-set was to let every student complete the training; the prevailing sentiment of FSP was to weed out as many as possible as early as possible. This change in philosophy notwithstanding, attrition continued to climb. Perhaps neither FIP nor FSP was entirely accurate in its ability to identify flying potential. The 1987 LATR program was an attempt to improve the reliability of the screening process.

The key difference between LATR and its predecessors is that the LATR program stresses training before attempting to screen out individuals, whereas the FIP and FSP attempted to spot innate flying problems very early in the process with or without prior training.

The 1987 LATR syllabus (ATC S-V8A-C) defined in specific terms the lesson plans and procedures for the training program. The three main parts of the training included ground academics, flying training, and officership and other contributing factors. The Air Force adhered to this protocol with steadfast devotion and the standardization was intense in terms of both intent and reality. (For specifics, consult the original.)

Ground Academics

The ground instruction consisted of primary information necessary for the cadet to understand the basics of flying theory and practice.

Military Policies and Procedures (1 hour). This lecture described course objectives, flight-line policies, and conduct while on the flight line; procedures for meals; and travel to and from the operations area. The lecture outlined military regulations regarding behavior and responsibilities both on the flight line and during the program.

Policies, Procedures, and Familiarization (3 hours). This block of instruction introduced students to training site policies and directives, flight directives, procedures for flight scheduling and aircraft dispatch, specific required flight items, required readings, and various policies required by the flight instructors. In addition the students received briefings on procedures for flying in the local area and on the basics of traffic control. Also at this time the students were introduced to the basic aircraft systems, checklist use, and the various procedures involved with operations of the aircraft while on the ground.

Airmanship (8 hours). During this block of instruction, the cadet examined the basic theory of flight and the applied application of the theory. The lectures covered the features of the Cessna 172 aircraft and its associated engine and systems and addressed the basics of radio communication and emergency procedures.

Flying Safety (1 hour). This lecture stressed the importance of flying safety; introduced the student to the Air Force's general philosophy on safety as well as to specific local, Air Training Command, and Air Force safety programs; and identified local hazards and problems on the flight line.

Testing (3 hours). The ground academic program consisted of three major tests, one on the academics block of instruction and two on the operational procedures. The students had to score 85 percent on each test to pass. A student not reaching the required score on the first attempt could retake a test. If the student had further academic difficulty, he or she faced elimination from the program. In addition, three bold-face emergency procedures tests were administered. The student had to complete those tests with a perfect score or be subjected to retest and possible elimination from the program.

Other Ground Activities (2.5 hours a day). Other ground training activity consisted of a daily physical education training period of 1.5 hours and various military drills and procedures.

Flying Training

Flying training comprised the major emphasis of the LATR program and was the primary screening factor. The training consisted of 11 aircraft flights for a total airborne time of 14 hours. During his field research on this project, the researcher first gained currency in the Cessna 172 and then flew as an observer during student flying operations to gain a qualitative insight to the actual mission parameters. The researcher at times expands on the descriptions of the individual sorties (lessons) in the Air Force syllabus to add qualitative insight to the written operational plan. Familiarity with the mind-set of the individual student pilot and instructor was important to understanding the level of instruction and proficiency developed.

The flying training lessons were broken down into two-hour time periods. The cadets reported to the flight line for a mass briefing of 15 to 20 minutes by the civilian instructor pilot flight commanders. The briefing consisted of a report on probable weather and conditions, a synopsis of the day's lesson, and an overview of the various emergency procedures and aircraft operations that could be encountered. The students then joined their assigned instructor pilots for a briefing on the individual mission to include the specific area where they were to practice maneuvers, the airfield at which they were to practice patterns and landings, and any techniques required for the ride. This preflight briefing normally lasted 10 to 15 minutes.

The instructor and cadet student pilot then walked to the assigned aircraft and conducted preflight operations. The mission was then flown for the prescribed amount of time, followed by a postflight inspection and tie-down of the aircraft, and then a short one-on-one debriefing of the student pilot by the instructor. The debriefing was often short since the instructor pilot may have had three students. A potential loss of standardization could have occurred at this point due to differences in the instructor work load, thereby adding a variable in student training protocol.

Flight 1, Instructor and Student Pilot (1 hour). During this ride, referred to in Air Force slang as a "dollar ride," the instructor demonstrated preflight, ground operations, departure, level flight, and the other basics of flight control. At this time the student was not expected to demonstrate any proficiency and the instructors enjoyed the "stick" time. The instructors then entered the landing pattern and performed a full-stop landing. Potential problems for the student included air sickness and perhaps manifestations of anxiety (MOA), to be defined below.

Flight 2, Instructor and Student (1.2 hours). This ride was similar to the first. The student had an opportunity to attempt the basic maneuvers and a traffic entry and approach and landing. The tone of the instruction was positive. The students were usually concerned with where to focus their attention, outside the aircraft or in the cockpit on the gauges and switches.

Flight 3, Instructor and Student (1.4 hours). During this ride, students practiced flight handling characteristics of the aircraft and stalls, both characteristic and secondary. The instructor explained the operation of the VHF omnidirectional range (VOR) receiver. The landing pattern was a priority.

Flight 4, Instructor and Student (1 hour). The student was introduced to slips and full-flap landings and reviewed the air work. He or she was expected to know the procedures and understand the basic parameters of the mission.

Flight 5, Instructor and Student (1.4 hours). The student reviewed the maneuvers introduced in the previous flights. At this stage, the student had been exposed to all of the maneuvers that were part of the training and was expected to perform the basic skills and procedures. (The maneuvering item file [MIF], below, contains a complete list of the required items and proficiency levels required.)

Flight 6, Instructor and Student (1.4 hours). The student reviewed all the maneuvers, with the emphasis on traffic patterns and landings.

Flight 7, Instructor and Student (1.4 hours). The student was expected to direct the mission and in essence perform most of the required items correctly and safely. If the student had made normal progress at this stage, he or she could land the aircraft safely and recognize unsafe situations as they developed.

Flight 8, Instructor and Student (1.4 hours). This flight was the first on which the student was required to show proficiency on all the required flight items. It was the first ride on which the student could have received an unable grade for lack of proficiency. This mission was also a watershed in that the next ride was a short dual followed by a student solo, with all its potential for a tragic end.

Flight 9-1, Instructor and Student (0.8 hours). The instructor and student performed at least three safe landings and patterns. When the instructor was satisfied with the ability of the student to fly the aircraft safely, part one of this ride was terminated and the instructor departed the aircraft after a full-stop landing.

Flight 9-2, Student Solo (0.4 hours). The student performed three takeoffs and landings.

Flight 10, Instructor and Student (1.2 hours). This ride was a complete review of the required check ride items. The student was required to perform all mission parameters to expectations in a safe, consistent manner.

Flight 11, Flight Examiner and Student (1 hour). This flight was the student's final ride and evaluation for the screening program. (The specifics of the flight check requirements are delineated in the section on quantification of performance.)

If the student was unable to satisfy requirements of the syllabus, he or she might make additional rides and get further instruction. However, the rate at which the student learned the flying techniques and data was considered an important aspect of fitness for undergraduate pilot training, and, as such, was highly significant in regard to success or failure.

Officership

As potential officers, the cadets were expected to display the attributes of good officership. These traits included adherence to the appropriate Air Force rules, regulations, and official protocol requirements. Deviations from these prescribed behaviors could have been grounds for rejection from the LATR program and could have resulted in the cadet's being rejected from consideration for undergraduate pilot training.

Possible Pitfalls

If a student pilot, after receiving initial training in the LATR program, developed a fear of flying and wished to withdraw from the program, he or she was put in the manifestations of anxiety category. The training syllabus defined MOA as follows:

> Although some slight anxiety or nervousness is common among students learning to fly, real fear of flying can interfere with a student's judgment, decision making ability, and physical ability to control the aircraft. Manifestations of apprehension can include such things as passive or active airsickness, insomnia, loss of appetite, anxiety and tension related to the flying environment. When a student exhibits or admits to any of the above symptoms to a degree that seems to impair flight-line performance, document the situation in the student's grade folder and refer the student to the Flight Surgeon for evaluation. Reference ATCR 161-3 and ATCR 51-2 for action to be taken by operational personnel when a student is determined to be suffering from MOA. (ATC S-V8A-C 1987, 9)

If the student suffered from MOA, the Air Force removed the student from the program. This action did not have any effect on the AFROTC cadet's possible Air Force career other than nonselection to UPT.

Another possible pitfall for the subject along the way toward UPT was airsickness.

> Students who experience airsickness require individual attention and a reasonable opportunity to adapt to the flying environment. Airsickness is defined as active (vomiting) or passive (does not include vomiting, but does result in significant deviations in the mission profile due to the student's discomfort or nausea). Most airsickness is of brief duration and is related to multiaxial accelerations, pulling G's, unfamiliar attitudes, and anxiety. Following the general UPT airsickness training philosophy outlined in ATCR 51-2, however if a student experiences airsickness following the C-6 mission the DCFO/CFO must approve the solo mission. Place a student on Special Monitoring Status if four episodes of airsickness are experienced. (ATC S-V8A-C 1987, 9)

If the student could perform the mission while airsick, the instructor did not make a notation of the problem. However, as the training became more intense, the student would be unable to fly the aircraft at the required level of proficiency while airsick. Any resulting lack of flying skill led to termination from the training program.

A student may have elected to voluntarily withdraw from the LATR program due to personal factors (self-initiated elimination or SIE); this step removed the student from any Air Force flying training in the future. If a student became injured or ill and could not complete the LATR class, he or she could be reinstated at a later date if a position was available and the student still met the requirements of entry. The student "washed back" into another training class at a later date or perhaps into the next year's selection pool. Cadets removed from the LATR program due to airsickness, MOA, SIE, illness, or injury were not included in the quantitative performance data but were included as to the pass or fail standard.

Mission Grading Parameters

The 1987 LATR program used a specific protocol that had been developed to enable a precise criteria-referenced evaluation of the student pilot's progress. Much effort was expended in the form of instructor pilot check rides and standardization meetings to ensure, to the most practical point attainable, that the grades received by the students were accurate and in relationship to the developed standards. In addition, the Air Force used the maneuver item file, which outlined levels of proficiency for specific lessons.

Grading Scale

The syllabus defined the absolute grading scale as follows:

Procedures for Grading Instructional Flights:

a. Absolute Maneuvering Grading. The following rating scale is used to evaluate the student's characteristic performance on each maneuver attempted during each sortie or observed during the supervised solo mission. This is an absolute rating scale and the student's proficiency must be judged against the training standard. Do not consider the type or amount of training the student has received.

(1) Demonstrated. Enter "D" on the record of training when the maneuver is demonstrated only, but not practiced.

(2) Unable (U). The student is unsafe or lacks sufficient knowledge, skill, or ability to perform the operation, maneuver, or task.

(3) Fair (F). The student performs the operation, maneuver, or task safely but has limited proficiency.

(4) Good (G). The student performs the operation, maneuver, or task satisfactorily. Deviations occur but are corrected in a timely manner.

(5) Excellent (E). The student performs the operation, maneuver, or task correctly, efficiently, and skillfully. Minor deviations occur but do not detract from overall performance.

b. Relative Overall Mission Grading. Rate the student on each maneuver accomplished using the absolute grading scale described above and assess a relative overall grade as soon as possible after the flight. Record these grades on the appropriate Record of Training (ATC Forms 878 and 860). When students are introduced to a maneuver, they may receive several Unable (U) grades. This does not mean the student is unsatisfactory or is not progressing normally since the average student may be unable to accomplish many maneuvers initially.

> Students should show progress on subsequent missions and a student's continuous failure to show progress should be reflected in the overall grade. In any case, if a student fails to demonstrate the required level of proficiency given in the MIF for the applicable instruction unit, the overall grade must be unsatisfactory. (ATC S-V8A-C 1987, 5)

Within the previously quoted parameters, the researcher observed differences in the way individual instructor pilots interpreted the grading standards, sometimes with intent. For example, in an attempt to motivate a student who seemed to lack confidence, the instructor pilot may have inflated the overall grade. The reverse also happened, an instructor may have reduced the grades of a student to drive home a message that the instructor wanted reinforced. The Air Force team of military instructors made every effort during 1987 LATR to prevent this practice from occurring. It would be naive to assume that it is not a factor in the grading, but the norm was adherence to the above printed standards with a high relative equality of grading criteria.

Maneuver Item File

The maneuver item file (table 1) specified the required aspects of each mission and the proficiency level expected from the student pilot in each of the areas. The Air Force followed this flight training outline during the 1987 LATR program with precise adherence to the profiles of each scheduled mission (lesson) and the expected level of proficiency.

The training syllabus provided overall procedural structure to the LATR program. The procedures outlined in the syllabus and the contract with Embry-Riddle enabled precise control of the treatment to the cadet subjects. By following the procedures outlined in these two documents, a researcher should encounter no problems in replicating the study.

TABLE 1

Maneuver Item File (MIF)

	Lessons*										
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11
Ground operations	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
Takeoff	U+	U+	U+	U+	U+	F+	F+	F+	F+	F+	F+
Traffic exit	D+	U	U	U	U	F+	F	F	F	F	F+
Straight level	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
Turns	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
Climbs	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
Level off	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
Coordination	U+	U	U	U	U	F+	F	F	F	F	F
Glides	U+	U	U	U	F+	F	F	F	F	G+	G+
Slow flight	--	--	U+	U	U	F+	F	F	F	F	F+
En route descent	--	U+	U	U	F+	F	F	F	F	F	F
Steep turns	--	--	U+	U	U	U	F+	F	F	F	F+
Power on stalls	--	--	U+	U	U	U	F+	F	F	F	F+
Traffic stalls	--	--	--	U+	U	U	U	F+	F	F	F+
Traffic entry	D+	U	U	U	U	U	U	F+	F	F	F+
Pattern	U+	U	U	U	U	U	U	F+	F+	F	F+
Normal landing	U+	U	U	U	U	U	U	F+	F+	F	F+
No flap landing	--	U+	U	U	U	U	U	F+	F+	F	F+
Go around	--	U+	U	U	U	U	U	F+	F+	F	F
Forced landing	--	--	--	U+	U	U	U	F+	F	F	F
Trim	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
Throttle techniques	U+	U+	U+	U+	F+	F+	F+	F+	F+	G+	G+
In flight checks	U+	U+	U+	U+	U+	F+	F+	F+	F+	F+	F+
Radio procedures	U+	U+	U+	U+	U+	U+	U+	F+	F+	F+	F+
Clearing	U+	U+	U+	U+	U+	U+	U+	F+	F+	F+	F+
In flight plan	U+	U+	U+	U+	U+	U+	U+	F+	F+	F+	F+
Emergency procedures	U+	U+	U+	U+	U+	U+	U+	F+	F+	F+	F+
VOR orientation	--	--	U+	U	U	U	U	--	--	--	--
Secondary stalls	--	--	U+	U	U	U	U	--	--	--	--
Slips	--	--	--	U+	U	U	U	--	--	--	--
Full flap pats	--	--	--	U+	U	U	U	--	--	--	--
Full flap landings	--	--	--	U+	U	U	U	U	U	U	U
Airmanship	U+	U+	U+	U+	U+	U+	U+	F+	F+	F+	F+
Blindfold check	--	--	--	--	--	--	--	--	--	F+	--

*A "+" symbol following the letter grade means the maneuver must be accomplished on that sortie. Absence of the "+" means the maneuver may be performed, but is not required to complete the mission. Maneuvers, once optioned, should be performed frequently enough to develop/maintain proficiency. (ATC S-V8A-C 1987, 12)

Dependent Variables

Two dependent variables (table 2) indicated the effect of the LATR program on the subjects: the standard USAF pass or fail grade and a quantified indicator of subject performance developed for this study.

Pass or Fail

The 1987 Air Force LATR flight screening program established a pass or fail category for each subject. An attempt was not made to rank or assign an overall score. A "top ten percent" was selected by a qualitative voting

TABLE 2

Independent and Dependent Variables

Independent variables	SPSS-X Codes
SAT scores	SATE
University grade point average	GPA
University academic major	M
1. Social Science	1
2. Math and Physics	2
3. Engineering	3
4. Aviation Science	4
5. Business	5
6. Computer Science	6
7. Other	7
University varsity sports competition	A
Prior flying experience	FLY
ROTC/University/College Det enrollment	DET
Air Force Officer Qualifying Testing	AFOQT
1. Academic Achievement	AA
2. Pilot	PL
3. Navigator	NV
4. Verbal	NB
5. Quantitative	QT
AFROTC quality index score	GIS
Gender	S
Dependent variables	
Results (pass-fail)	R
Performance	PERF

system among the civilian flight commanders and the Air Force instructor staff. The syllabus, S-V8A-C, defined the requirements for graduation and the specifics that may have led to elimination. The independent variables were examined in relationship to the pass or fail criterion established by the official Air Force results generated by the LATR program. The pass or fail grade was coded as R.

Quantified Performance

To further explore the effects of higher education curricular variables on the performance of the AFROTC cadets, the following protocol was developed to code and quantify the individual performance of the cadets. At first reflection it seemed appropriate to assign a value to each entry in the student's grade folder and simply derive a numerical score. However, factors could influence the resulting data. For example, individual instructors assigned grades to the students in different situations, with great variety. Contrasting ideas on motivational strategies, differences in instructor egos, variations in student-instructor relationships, and numerous other factors would influence grades regardless of the effort expended to control the grading process.

Another consideration was how to weight each grade entry since certain aspects of the flight training are far more significant than others. For example, the flight examination was quite an important factor, one which in later flight training may spell success or failure at UPT. A student pilot must perform during evaluations when undergoing military flight training. A student who did not test well likely would experience severe problems in later flight training programs. The coding system used in this research should reflect promise in reference to performance. As a result the weight of the various factors of flight screening must be considered.

The total student score for the LATR program consisted of three parts: a qualitative, overall score on missions C08, C09-1, C10, and C11; the quantitative score of all 28 factors performed on the final examination check ride mission; and the total points scored on the three written tests. Each portion accounted for approximately one-third of the total, considering normal student performance. To minimize the variation due to subjectivity and to place performance in its proper context, the research used the following coding system. The total of all the measures was coded PERF.

Part 1, Qualitative Mission Score. Student flights C08, C09-1, C10, and C11 were selected as watershed points during the program. The grades for each mission were coded in the following manner.

Unable	(U)	= 00 points
Fair	(F)	= 30 points
Good	(G)	= 60 points
Excellent	(E)	= 90 points

The total points for the four missions were added to the performance total.

Mission number C08 was the first mission that, in accordance with the maneuver item file, required student proficiency on all required items. It preceded the student solo and, hence, required a sound evaluation by the instructor pilot. The instructor was most likely to present a true evaluation of the student's ability at C08 because the student would attempt to solo on the next flight. At this point, previous experience and differences in learning curves began to level out and a relatively uniform picture of actual flying ability resulted. Mission number C09-1 was the first half of the student's first solo flight and the instructor needed to make as pure a judgment call as possible for the obvious safety considerations.

Mission number C10 was the last ride that the student and the assigned instructor flew together under normal conditions. It was a practice check ride and all items in the maneuver item file were reviewed. The overall grade received on this ride reflected the instructor's best evaluation of the cadet. The next mission was conducted by a civilian pilot of flight commander rank or one of the military staff and would serve as the student's final evaluation. This check ride not only graded the student but also provided data on the effectiveness of the instruction. The instructor pilot attempted to evaluate the student on ride C10 very realistically, as another opinion was forthcoming on ride C11 from the instructor's superior.

The final examination, ride C11, was the most accurate attempt at quantitative evaluation. This mission was graded by a check pilot other than the student's civilian instructor pilot. The parameters of the check flight were quite specific. The check ride was in reality the best indicator of performance as it demonstrates, under pressure, the actual ability of the student. The military considers this ability to respond under pressure a valid part of the selection process.

Part 2, Quantitative Scoring, Examination Flight. The examination check mission consisted of 28 graded factors that have specified and defined parameters existing in the syllabus. The Air Force made an intense effort to ensure that the grades received by the cadets on the examination check mission were as specific in nature as possible and reflected the ability of the student pilot. The Air Force defined the parameters for the grading criteria and conducted meetings with the instructor pilots, and an Air Force evaluator flew with each check pilot--all in an effort to arrive at a standard result on the evaluation flight. Part 2 of the total performance score was weighted as indicated below.

U = 00
F = 06
G = 12
E = 18

The scores for each of the 28 graded factors were added and the total was the score for part 2. If a factor was not graded on the check ride for an operational mission consideration, then the score from the last time the student performed that requirement was logged for inclusion in the total.

Part 3, Academic Scores. Part three of the total performance score was the summation of the three academic tests. Each test was worth 100 points and the total of all three comprises the score for part three. If a student failed a test, scoring below 85 percent, this first score was used to calculate the part three total, even if the student retested and achieved a higher, passing score.

Total Score. The totals for each of the three parts of the scoring were added and the student received one score that was indicative of total performance (PERF). The independent variables were explored in light of this criterion-dependent variable, along with the dependent variable of pass or fail for the total program.

Quantified Performance Factor Equation

PERF = Qualitative Flying + Quantitative Flying + Academics

Where,

Qualitative flying = sum of scores for missions 8, 9-1, 10, and 11 (score defined as E = 90; G = 60; F = 30; and U = 00),

Quantitative flying = sum of scores for 28 factors on mission 11 (score defined as E = 18; G = 12; F = 6; and U = 0), and

Academics = sum of actual scores on the three written tests.

The Independent Variables

The independent variables listed (table 2) were indicated in the literature to have been relevant in the pilot screening process and were in general part of the current selection process. The primary focus of this study was to determine if use of these variables was indicated as justified when screening for piloting ability. One of the overriding considerations for looking at these variables was that those responsible for the AFROTC selection procedure were currently reviewing most of these variables. In addition, most of these data would be readily available if future investigation indicated that it would add to the prediction of success or failure at UPT. A brief description of each independent variable and the rationale for its inclusion follows.

Scholastic Aptitude Test Scores

The Scholastic Aptitude Test (SAT) score--coded SATE--of each subject was included in the study in an attempt to determine if these scores related to flying performance. The SAT is a part of the selection criteria for AFROTC; in the past a high score has enhanced the student's chance of selection for UPT. The Air force seems to assume that a good SAT score increases a student pilot's chances of graduating from UPT, thus indicating a relationship to sound flying skills.

University Grade Point Average

The university grade point average (GPA) has been one of the primary criteria for selecting students for the advanced AFROTC program. AFROTC makes all of its UPT selections from among those students in the advanced AFROTC program. Hence, the UPT selection process places a value on a high GPA. As with SAT scores, the Air Force seems to see a relationship between high GPAs and success in UPT.

University Academic Major

The question as to what type of academic major (M) enables completion of military flying programs has been debated greatly. Military thinking on the subject seems to have favored mathematics and engineering. These majors have enhanced selection to UPT. AFROTC has given most of its scholarships to students with these majors. Research on the subject as to whether specific academic majors may relate to an increase in flying ability has been inconclusive.

University Varsity Sports Competition

This variable (A) is not considered in current UPT selection procedures. This researcher, through observation of the military flying community, has determined that a large percentage of successful military aviators had been college athletes. Any subject who played at least one year of varsity sports at the college level was considered a varsity athlete.

Prior Flying Experience

Individuals who have qualified for a private pilot's license are not required to attend LATR. Other students may have some flying hours but have not yet qualified for their certification. They were required to attend LATR. It seemed logical that in a program such as LATR that any flying experience would enhance the ability of the student to complete the program. Previous research reflects little, if any, relationship between prior flying experience and success at UPT. If the variable of previous flying (FLY) has an effect on the outcome of the LATR experience, it may be reducing the effectiveness of the screening program.

AFROTC Detachment

The individual detachment or university (DET) at which the student was enrolled could have an influence on the ability to perform during the LATR program. It was not possible to evaluate this factor because of insufficient numbers of subjects. If there had been sufficient subjects from each detachment, these data would have been analyzed.

Air Force Officer Qualifying Test

The AFOQT is a primary part of the current UPT selection process. Previous research supports, in some degree, the use of this testing procedure.

AFROTC Quality Index Score

AFROTC has developed the quality index score (GIS) to grade and rank individual cadets on their potential for success at UPT. It is considered the primary selection instrument.

Gender

Variations in male or female (S) performance in the LATR program would provide relevant information for determining if any differences exist between the sexes as to flying ability.

Statistical Analysis

The statistical analysis used in this study consisted of six steps. The computer program SPSS-X was the method of calculation for the study. The following outline delineates the protocol.

1. Subject demographics. Standard tables were completed for each of the three LATR class groups. A composite group was then compiled by including the results and data from all three classes in total. Histograms were developed for PERF, SATE, GPA, GIS, AA, PL, NV, VB, and QT. These data were analyzed for normal distribution. All variables with means were subjected to analysis of variance searching for significance at the .05 level. Frequency variables R, A, and M were evaluated with the chi-square test. To determine if any of the variables are related, a Pearson correlation coefficient was employed. If the above procedure determined that the four groups were uniform, then the remaining procedures examined only the composite data. If a variation within the groups was apparent, the individual groups were examined. When appropriate, the remaining analysis was directed toward the composite group with variations if necessary. X-Y plots of the variables were developed to further explore the relationships.

2. Pass-fail. The subjects were divided into two groups: those who passed the LATR program and those who failed. The standard table format displays subject demographics. T-tests searching for significance at the .05 level examined the variation between the two groups in FLY, SATE, GPA, AA, PL, NV, VB, QT, and GIS. Chi-square was employed to test variation in S and A.

3. Subject categories. The subjects were placed in groups dependent upon the following variables: Gender (male or female); prior flying experience (fly or no fly); and varsity athletics (yes or no). The standard table for demographics was completed on each of the six resulting subgroups. Chi-square was used to determine if significant variation exists within the three main groups on R. T-tests were performed to examine variation on PERF in each of the three categories.

4. Academic majors. Subjects were divided into seven academic groups in relationship to the previous stated categories. The standard tables on subject demographics were completed for each group. A one-way multiple analysis of variance was completed for each of the following variables: PERF, FLY, SATE, GPA, GIS, AA, PL, NV, VB, and QT at the .05 level of significance. A crosstabulation (CROSSTABS) of the seven academic majors and R was completed and a test for significance employing chi-square was undertaken.

5. Discriminant analysis. To determine the effect of the independent variables on R, A, FLY, SATE, GPA, M, GIS, AA, PL, NV, VB, and QT, a discriminate analysis (DISCRIMINANT) was employed. A case sequence number (SEQNUM) was developed for each subject and histograms for the canonical discriminant functions produced.

6. Multiple linear regression. To determine the effect of the variables S, A, FLY, GIS, SATE, GPA, M, AA, PL, NV, VB, and QT on the dependent variable PERF, multiple linear regression analysis (REGRESSION) was used searching for significance at the .05 level. A regression line plot was developed. A significant relationship between the dependent variables R and PERF to the independent variables S, A, FLY, SATE, GPA, M, GIS, AA, PL, NV, VB, and QT will be cause to reject the null hypothesis. If a significant relationship in the above variables is not indicated by the analysis, the null hypothesis will stand.

CHAPTER 4

RESULTS

In this study, the researcher adhered to the statistical analysis plan and methodology described in chapter 3. His analysis produced the following results. Seven of the independent variables were significant at the .05 level of confidence. Previous flying time, varsity athletic experience, and the pilot, academic achievement, and navigator portions of the Air Force Officer Qualifying Test (AFOQT) all proved significant. Academic grade point average and the verbal section of the AFOQT were significant in the negative context. High scores on these two variables proved detrimental to the success of the LATR program. The results of the data collection are presented in appendix A.

Analysis of Subject Demographics

The researcher examined the three classes of Air Force Reserve Officer Training Corps (AFROTC) cadets attending the 1988 LATR program to determine if the classes were of similar composition. Summaries of the characteristics of the three classes are presented in appendix B, tables 1, 2, and 3. (Table 4 deals with all subjects.) The results of this examination are presented in the following paragraphs.

Histograms of the variables performance (PERF), Scholastic Aptitude Test (SATE), grade point average (GPA), quality index score (GIS), and academic achievement (AA), pilot (PL), navigator (NV), verbal (VB), and quantitative (QT) portions of the AFOQT showed a normal distribution. A composite group of all three classes was developed and again a normal distribution was found for the above variables. Histograms of the variables are included in appendix C.

The variables PERF, SATE, GPA, GIS, AA, PL, NV, VB, and QT for all three LATR classes were examined by an analysis of variance searching for significance at the .05 level. No significant difference in the means among the three separate classes was evident. Frequency variables--dependent variable R (results, pass-fail) and independent variables A (athletics) and major (M)--were evaluated with a chi-square test. No significant differences were displayed between the three student classes.

To determine if a relationship existed among the variables, they were examined by a Pearson correlation coefficient test. The results are contained in appendix D.

In addition, an X-Y plot of the interval variables projected with the PERF variable is provided (appendix E). After examining the distribution of the variable detachment (DET), the researcher determined that there were not adequate numbers in the various categories with which to develop meaningful data; hence, DET was dropped from further consideration during this research study.

Dichotomous Variables

As a result of the above analysis, the researcher concluded that the three LATR classes were quite similar in demographics and the remaining data analysis could proceed with a composite sample of all three classes of the 1987 LATR program.

Pass or Fail during the LATR Program

The subjects were divided into two groups for this analysis: those who passed the LATR program and those who failed and were disqualified from future flying training. For a summation of the demographics of these two groups, consult appendix B, tables 5 and 6. A T-test was performed to evaluate for significant differences at the .05 level for the independent variables FLY, SATE, GPA, AA, PL, NV, VB, QT, and GIS (appendix F). Of this group, only prior flying experience (FLY) proved to be significant. The other independent variables did not vary significantly between the pass and fail groups. A categorical independent variable, varsity athletics (A), was identified for further evaluation. Of the 230 subjects who passed the LATR program, 33 were identified as college atheletes, while none of the 35 in the failure group had competed in varsity athletics. There were no significant differences in pass or fail (R) in relationship to gender (S). Overall, the pass and fail groups differed as to prior flying experience. The pass group contained 113 cadets with prior flying experience. The mean flying time for this group was 16.31 flying hours. The mean time for the eight cadets with flying experience in the fail group was 3.875 flying hours. The variation in the means of the two groups for the variable FLY was statistically significant at the .004 level.

Effect of Prior Flying Experience

To explore further the independent variable FLY, the researcher divided the population into two groups: a group composed of cadets with more than four hours flying time prior to entering LATR and a group that had four or less hours experience before entering the program. Summaries of the two groups are listed in appendix B, tables 7 and 8. A T-test was performed on the variables PERF, SATE, GPA, GIS, AA, PL, NV, VB, and QT within these two flying groups in an attempt to determine if factors other than prior flying experience may have influenced the success rate of the cadets (appendix F).

The single other variable of significance was PERF during the LATR program. The group with prior flying experience compiled the mean of 778.2, while the nonexperienced group scored a mean of 709.8. This difference was significant. The other variables did not indicate a significant difference between the two groups.

University Varsity Sports Competition

Two groups of subjects were formed for the purpose of analysis. One group of 33 subjects, which represented the cadets who were classified as varsity athletes and a group of 232 who did not have varsity athletic experience (appendix B, tables 9 and 10). Of the 33 varsity athletes, none failed the LATR program. In the nonathlete category, 35 failed. A chi-square analysis indicated that the difference in pass or fail was statistically significant (appendix G). A T-test was performed to compare the means of the variables SATE, GPA, GIS, FLY, AA, PL, NV, VB, and QT within the varsity athletes. There were no significant differences in the mean values (appendix F).

Gender as a Variable

The LATR cadets were divided into two groups dependent upon gender (S). The population included 13 females and 252 males. The data for the two groups is listed in appendix B, tables 11 and 12. A chi-square test for significant differences in the LATR results variable R with respect to gender was not significant. T-tests were developed searching for significant variation in the means of SATE, GPA, GIS, PERF, FLY, AA, PL, NV, VB, and QT. The females displayed higher scores at the .05 level in the following areas: SATE, AA, PL, NV, QT, and GIS. There was no significant difference in PERF (appendix F).

Effect of Academic Majors

The cadets were categorized into seven different academic majors as delineated in chapter 3. For the specific breakdown and values within each subject major, consult appendix B, tables 13, 14, 15, 16, 17, and 18. The effect of academic major (M) on the results (R) of the LATR program was evaluated by a cross tabulation of M by R and by a chi-square (appendix G). There were no significant differences in the pass or fail criteria for the various academic majors. To determine if a difference in the dependent variable of cadet performance during the LATR program and academic major existed, a one-way analysis of variance was performed between PERF and M-1, M-2, M-3, M-4, M-5, M-6, and M-7. There was no significant difference between the variables (appendix H). The academic majors were then explored for between group variation in SATE, GPA, GIS, FLY, AA, PL, NV, VB, and QT by a one-way analysis of variance. There were no significant differences among the academic majors within these variables. It was determined that there was no variation in the dependent or independent variables for the subjects in relationship to academic major during the 1987 LATR program.

Multivariant Analysis of Dependent Variables

The dichotomous dependent variable success in the LATR program (R) was subjected to a discriminant analysis for the following independent variables: SATE, GPA, GIS, FLY, A, M, S, AA, PL, NV, VB, and QT. Five of the variables had a statistically significant bearing on determining subject placement in the pass or fail category. The variables, listed in order of descending influence, are FLY, A, NV, VB, and GPA. GPA and VB influence the analysis in a negative fashion. The higher the GPA or VB the more probability of placement in the failure group. Varsity athletics (A), an increase in prior flying experience (FLY), and higher scores in the navigator (NV) portion of the AFOQT discriminate toward placement in the pass group. Appendix I shows the results of the discriminant analysis.

The dependent variable PERF was subjected to multiple linear regression analysis with S, GIS, A, FLY, SATE, GPA, M, AA, PL, NV, VB, and QT as the independent variables. The results indicated that three of the independent variables added to the predictive ability of the equation at the .05 level of confidence. The variable FLY was entered on step one with a multiple $\underline{R}$ of 0.28302 and an $\underline{R}^2$ of 0.08. Step two derived NV with a multiple $\underline{R}$ of 0.34642 and an $\underline{R}^2$ of

0.12001. On step three, AA displayed a multiple R of 0.37316 and an R^2 of 0.13. Appendix J shows the regression analysis to include the case-wise plot of the standardized residuals, a histogram of the residuals, a plot of the residuals, and a standardized partial regression plot for the three significant variables.

The dependent variable R (pass or fail) was also subjected to multiple regression analysis by coding 0 or 1, and the results were as follows. On step one the variable FLY was again the most influential with a multiple R of 0.17590 and an R^2 of 0.03 while displaying a significance of F of 0.0041. On step two, the variable varsity athletic competition (A) produced a multiple R of 0.23282 and an R^2 of 0.05421. The significance of F was 0.0007. The other independent variables did not add significantly to the explanatory power of the equation.

A relationship exists between the variable PERF and FLY, as indicated by a correlation of 0.283 at a level of significance less than 0.0001. In addition, a correlation of 0.229 exists between the variable PL and PERF. PERF correlates with the variable NV at 0.206. A relationship between the variable FLY and PL exists at a correlation of 0.18 at a significance level of .002 (appendix E). In response to these relationships, the PL variable, which displays a higher correlation to PERF than the NV variable, does not add to the predictive quality of the regression equation if all the variables are included. To resolve the influence of the PL variable on PERF in interaction with the other independent variables, a multiple regression analysis was performed with the independent variable FLY removed from the equation. This regression analysis placed the variable PL on the first and only step, with a multiple R of 0.22908 and an R^2 of 0.05248. The significance of F was equal to 0.0002. The regression sequence complete with residuals is contained in appendix K. This procedure demonstrated the significant influence of the variable PL on the dependent PERF.

Summary of the Results

The following independent variables proved statistically significant in contributing to a cadet's level of performance and success or failure during the LATR program.

- Prior flying time (FLY) influenced both the performance (PERF) and the rate of pass or fail (R) during the LATR program.

- Varsity athletic experience at the college level was a determining factor in the success or failure but did not influence the cadet's quantitative performance (PERF).

- The results of the analysis of the Air Force Officer Qualifying Test were mixed. The pilot, navigator, and academic achievements were statistically significant indicators from a positive viewpoint. The greater the score, the greater potential for a high performance score or success during the LATR program. However, the verbal part of the test was a negative indicator. Success was related to a lower score in the verbal section of the AFOQT.

- Grade point average (GPA) was also a negative indicator of success. The lower the grade point average the more potential for success in the LATR program. Grade point average did not influence the level of quantified performance (PERF) during the program.

- The other independent variables of the study, sex, quality index score, academic major, scholastic aptitude score, or the quantitative section of the AFOQT did not display a relationship with the two dependent variables PERF and R.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Based on the data analysis, this researcher concludes that a significant relationship is evident between three of the higher education curriculum variables--prior flying time, athletics, and portions of the Air Force Officer Qualifying Test--and subject performance in the light aircraft training (LATR) program for Air Force Reserve Officer Training Corps cadets conducted at Embry-Riddle Aeronautical University during the summer of 1987. In this chapter, the researcher identifies the curricular variables that proved significant, analyzes why the relationship occurred, and discusses the possible ramifications of such a relationship. The researcher also examines the independent variables that did not display a relationship with the two dependent variables and critiques their possible relationship to the selection issue. The researcher closes this chapter with his recommendations and a short summation of the study.

Prior Flying Experience

LATR program cadets with prior flying experience showed significantly higher success (pass or fail) and scored significantly better on the quantified variable of performance than cadets who had no flying experience prior to the program. This relationship is quite logical. The LATR program is a short-duration, criterion-referenced experience requiring that basic skills be developed within the first few hours of flight training. A cadet with these skills already evident is at an advantage during the program. Much of the determination of a cadet's suitability for undergraduate pilot training (UPT) is focused on the rate of learning. A student pilot who may be relearning or enhancing prior skills has a distinct advantage when compared to peers in relationship to these factors. An AFROTC cadet with flight time as part of a curricular program during the university experience has a definite advantage when competing in the LATR program for a position in UPT.

Past studies have shown little, if any, significant relationship between prior flying experience and the graduation rate at UPT. In the researcher's opinion, prior civilian flying time is not a factor in enhancing success at UPT and does not relate to superior performance in the operational years following UPT graduation because the demands of military flying are far more rigorous than those of the civilian sector and the initial advantage is well diluted long before graduation from UPT. Using prior flying time as a selection criterion for LATR and UPT may overstate the effectiveness of the LATR program as a device to identify cadets for UPT by weighting the pool of selected cadets with those that have some prior flight experience.

Varsity College Athletics

AFROTC cadets who had experienced at least a year of varsity, college-level athletic competition as part of the total higher education curriculum were significantly more successful in the program as measured by pass or fail. This finding is subject to judgment as the results of the chi-square were not entirely conclusive because of lack of sufficient numbers in the fail cell of the crosstabulation (appendix G). However, it is logical to conclude that the relationship between success and varsity athletic group membership is significant. If the results had been less definitive, by having produced some failures, the total criteria for the chi-square would have been obtained. An increase in the number of students who were classified within this category would additionally add to the strength of the finding. Furthermore the strength of the relationship derived by the regression analysis is in support of the finding.

To draw any conclusions as to why the relationship between this specific variable and success in flight training programs exists is well beyond the scope of this research. Nonetheless, the researcher speculates that the relationship derives from the psychological profiles of the cadet athletes and their environmental conditioning rather than any physiological variation such as superior hand-eye coordination. By definition the category of varsity athletics does not screen specifically for physiological traits. A varsity college marksman is included, as is a weightlifter. The actual training aircraft also is probably not a discriminating factor. A light aircraft will not differentiate between speed of reflex or other physical parameters and then translate the variation into superior performance.

What may separate the varsity college athlete from the normal population is the exposure to stress and other psychological conditions that are present both in flight training and athletic competition. By the time an athlete reaches the level of college competition, he or she is conditioned to perform under pressure. This pressure may be in the form of negative reinforcement from a coach, peer pressure, or an individual ego-gratifying strategy. Those who survive the sports system and continue competing at the college level have individual strategies that facilitate performance under high levels of stress.

Flying training requires an identical adaptation to stress. To perform during the LATR program, the cadet must have the ability to continue to learn a physical and mental skill while under perceived high stress. The ego drive to become an Air Force pilot, the pressure to succeed along with peers, and the stress of operating in an aerial environment, all while being subjected to negative criticism by the flight instructor, creates the same psychological state as does athletic competition. The college athlete is conditioned to, and has successfully adapted to, performing while in this mental state. It is the opinion of this researcher that this similarity may explain much of the success of the varsity athletes in this study. Speculation aside, the cadets classified as varsity athletes completed the LATR program at a rate significantly different from the norm.

Air Force Officer Qualifying Test

Four of the five parts of the Air Force Officer Qualifying Test (AFOQT) demonstrated a significant relationship with the cadet's performance in the LATR program, although the strength of the relationships was not impressive. The pilot section of the test was the best indicator on an individual basis. A high score on the pilot section indicated a correlation with both success, as measured by pass or fail, and quantified performance. High scores on the navigator and academic sections added a slight increase in the ability to predict the outcome of a cadet's participation in LATR. The verbal section of the AFOQT was related to success only from a negative viewpoint. Cadets with high scores on the verbal section were more prone to failure during LATR. However, this relationship was very weak, and although statistically significant, not of operational value.

In reference to the 1987 LATR program, although there is a small relationship between the AFOQT and the dependent variables of pass-fail and quantified performance, the test provides only a slight predictive indication of the cadet's ability to complete the screening program successfully. This evaluation of the AFOQT must be placed in the proper context. The relationships may be small, but, in the opinion of this researcher, the AFOQT is still the best paper test instrument yet developed to screen flying training applicants. The pilot portion is quite relevant to the task of providing an initial evaluation of an applicant's potential for flying training.

College Grade Point Average

The cadet's college grade point average displayed a slight but statistically significant relationship to his or her success or failure in the LATR program. In reference to the 1987 LATR program, the higher the cadet's grade point average, the greater probability that the student would fail the screening program. This tendency was exhibited only under discriminate analysis and only on the fifth and final step analysis. When the grade point average was examined within the pass or fail groups, it was not proven significant by T-test. In addition, the Pearson correlation was not impressive. In consideration of the above analysis, in the researcher's judgment, it was concluded that it was not logical, from any operational perspective, for a cadet's grade point average to influence performance during the LATR program.

Curricular Variables Not Affecting Performance

The other curricular variables that were the focus of this study did not display a relationship to the outcome of the cadet's performance in the LATR program. Sex, academic major, Scholastic Aptitude Test scores, and quality index scores did not display a relationship with the dependent variables of the research design. The absence of a relationship here is quite interesting as three of the four are now used as selection criteria for entrance into the LATR program.

Academic Majors

The Air Force displays a selection bias, in reference to both LATR and UPT, toward what it describes as hard, as opposed to soft, majors. These majors include the math, physics, and engineering categories of this study. The researcher concludes that this bias is not justified when evaluated in conjunction with the results of this study. Differences in academic majors did not demonstrate any significant variation in either of the LATR program's two dependent variables. Based on the results of the 1987 LATR program, the researcher concludes that there was no relationship between a cadet's academic major and performance.

Scholastic Aptitude Test Scores

A high Scholastic Aptitude Test (SAT) score enhances selection to both the advanced AFROTC course and to UPT via LATR in current AFROTC procedures. This selection bias is not justified when viewed within the confines of this study. The researcher concludes that there was no relationship between SAT scores and performance during the LATR program of 1987.

Quality Index Score

The AFROTC quality index score (GIS) is one of the primary differentials used for selection to UPT via LATR. The researcher concludes that there was no significant relationship between the quality index score variable and performance during the 1987 LATR program.

Gender

Males and females did not display significant differences in relationship to either pass or fail or to quantified performance during the 1987 LATR program. Nevertheless, the females were subjected to a significantly more rigorous selection criteria than were the males. Because the females scored significantly higher in Scholastic Aptitude Test scores, quality index scores, and AFOQT scores, one could conclude that the Air Force is requiring higher standards from the female applicants to UPT in hopes of establishing equal graduation rates in comparison to the males.

Air Training Command folklore seems to substantiate this conjecture. This logic breaks down when one considers the equal rates of success in UPT at present among males and females. When considering the results of this specific research study, this logic is even less clear. The variables of quality index score and SAT score have no effect on the LATR performance. The AFOQT, although a significant indicator, in reality has little predictive effect. If the variables for selection to UPT via LATR, on which the females are required to display higher values, do not affect the total subject population in reference to performance in LATR, then why the apparent variation in selection criteria? The researcher concludes (1) that gender as a variable had no effect or relationship to quantified performance or success during the 1987 LATR program, but (2) that significant variations did occur in the required entry standards into the flight screening program in relationship to gender.

Recommendations

Given these findings, the Air Force needs to make the following changes in its LATR and UPT selection criteria and policy.

1. The issue of cadets with previous flying time competing for selection to UPT with cadets without flying experience should be addressed. A selection bias that considers prior flying time as advantageous to a cadet's selection should be examined. The issue should be resolved from the viewpoint as to how the prior experience affects actual "operational proficiency" at a later stage in the military flier's career, not specifically the graduation rate from LATR or UPT.

2. A research effort should be directed toward determining if the results of this LATR study, in reference to the success of the varsity athletes, will replicate with UPT as the treatment. Additional research should examine the variable of past varsity athletics membership to determine if a relationship with successful military aviators in the operational field may exist. This variable is, in addition, an interesting area for research in reference to the fighter-qualified pilots and those individuals not selected for this type of flying specialty. The researcher recommends that consideration should be given to including the athletic competition variable as a strong positive indicator of potential success as a military aviator.

3. The AFOQT should continue to be employed as a selection instrument for UPT. However, the screening should be made in relationship to the strength of the individual candidate on only the pilot and navigator sections if the goal of selection is flight potential only. Research should be continued to update and refine this valuable test instrument.

4. The issue of female pilot selection needs to be examined. If it is determined that standards are different on variables that have no relationship to flight success, the researcher recommends that this differentiation be terminated. The variable of gender should be subjected to close examination in reference to success at UPT and research should be continued to include operational flying performance variations.

5. Current pilot selection criteria contain elements that have displayed no relationship to success in either LATR, as demonstrated by this research design, or in UPT, as shown by past research. Thus, this researcher recommends that the Air Force and its component commands review the current selection procedure and eliminate those specific aspects that do not add to the prediction of success in flight training. A clear distinction needs to be defined as to what attributes are specifically desired for flying operations and what attributes are contained within the pilot selection criteria to enhance the total Air Force officer corps concept.

A Brief Summary of LATR 1987

The 1987 LATR program provided a unique opportunity to explore the question of what specific variables may influence a qualified individual's ability to pilot military aircraft. The specificity of the research design prevents accurate statistical inference to other subject populations and flight training programs. However, the implications of the study are clear: the men and women selected for Air Force pilot training over the past 20 years have been very similar--the basic selection criteria have remained consistent. The rate of attrition from the undergraduate pilot training program has also remained somewhat consistent, with variations being detected as supply and demand change. The LATR research study was clear in indicating that many of the selection criteria did not relate to flying performance. With the similarity of populations, it is very possible that these variables also have no effect on UPT or operational flying. It is additionally apparent that varsity athletic competition may continue to exert an effect during UPT. Undergraduate pilot training

This research design was successful in describing basic concepts that could prove useful in future research that may be developed to improve the selection process for UPT. The research established that specific parameters that have in the past been considered important discriminators for selecting cadets for flight training do not show validity as selection criteria. The contribution of quantifying the specifics of existing relationships will provide a sound reference on the question of curricular variables and their effect on flight performance.

APPENDIX A

DATA SET 1

SUBJ	R	PERF	DET	S	A	FLY	M	GPA	*GIS*	SATE	AA	PL	NV	VB	QT
1001	1	664	010	0	0	000	1	300	10413	1321	88	53	61	92	78
1002	1	704	010	1	0	000	2	290	09162	1123	76	55	65	72	75
1003	1	775	010	1	0	000	5	248	09923	1361	84	69	86	69	90
1004	1	630	012	1	0	000	1	287	07813	0970	44	61	57	41	52
1005	0	336	012	1	0	000	5	245	08003	1170	61	53	56	55	64
1006	0	341	012	1	0	000	7	217	07373	0979	51	76	66	55	48
1007	0	746	035	1	0	000	3	358	09450	1250	75	84	79	74	69
1008	1	831	060	0	0	000	3	247	09726	1240	84	94	86	90	71
1009	1	939	105	0	0	035	5	355	10062	1200	71	66	62	80	81
1010	1	832	130	1	0	011	5	318	10184	1240	82	58	71	84	75
1011	1	797	130	1	0	000	3	296	08846	1200	84	60	76	67	91
1012	0	000	145	0	0	000	7	250	10516	1321	89	95	93	81	90
1013	1	685	145	1	0	000	1	360	09822	1218	76	57	63	74	71
1014	1	690	145	1	0	000	6	349	09348	1130	69	76	73	69	64
1015	1	915	145	1	0	000	1	239	08629	1060	63	87	83	67	57
1016	0	410	145	1	0	003	5	324	08230	1140	72	67	66	77	64
1017	1	717	145	0	0	000	2	334	10736	1384	99	86	96	96	99
1018	1	750	145	1	0	000	1	222	07646	0910	69	52	61	74	59
1019	1	818	150	1	0	000	3	330	10872	1240	89	94	89	90	80
1020	1	913	150	1	0	000	3	334	08379	1020	61	86	85	48	71
1021	1	672	150	1	0	000	7	270	08442	1053	63	71	73	44	80
1022	1	753	150	1	0	015	1	278	08627	1160	61	81	85	40	80

Data Set 1--continued

1023	1	849	150	1	0	000	2	340	07573	1053	33	67	61	33	38
1024	1	799	155	1	0	000	1	348	10944	1302	95	97	99	86	96
1025	1	713	155	1	0	000	2	322	08631	1130	50	45	52	41	61
1026	1	743	157	1	0	010	3	391	09359	1120	68	77	72	67	64
1027	1	836	157	1	1	021	4	245	07024	0874	34	60	62	26	52
1028	1	871	158	1	0	000	1	248	08333	1040	78	66	79	64	82
1029	1	670	158	1	0	008	1	227	07669	0985	52	52	30	74	31
1030	1	990	158	1	0	052	5	267	09228	1110	61	67	75	36	85
1031	1	816	158	1	0	002	1	334	10127	1123	72	83	73	77	64
1032	1	830	158	1	0	030	3	244	07305	1230	28	87	73	31	33
1033	1	689	158	1	0	004	1	233	08917	1170	89	89	91	86	86
1034	1	766	158	1	0	000	1	292	06931	0970	27	64	56	23	43
1035	1	667	158	1	0	001	2	253	08872	1030	84	87	96	57	95
1036	1	898	159	1	0	010	3	240	08372	0990	83	82	83	67	90
1037	1	813	159	1	0	000	1	239	07766	0936	44	70	53	46	45
1038	0	410	205	1	0	000	3	305	08095	0942	43	56	53	32	61
1039	1	565	220	0	0	000	1	297	10759	1321	88	53	60	87	82
1040	1	924	220	1	0	001	1	207	08002	1110	71	83	72	86	52
1041	1	658	290	1	0	000	7	228	06970	1048	63	57	38	84	38
1042	1	825	290	1	0	020	2	265	08042	1053	63	95	84	72	52
1043	1	800	355	1	0	008	3	242	09168	1300	89	74	79	99	69
1044	1	645	355	1	0	000	3	212	07289	1100	49	63	61	40	61
1045	1	720	355	1	0	000	3	305	10422	1240	93	93	95	81	95
1046	1	777	370	1	1	000	5	278	08746	1090	81	96	96	62	90

Data Set 1--continued

1047	1	750	430A	1	0	023	4	295	07053	0880	34	66	42	46	26
1048	1	720	432	1	0	000	5	261	07104	0855	34	57	51	26	52
1049	1	728	485	1	1	016	5	230	08164	0991	53	48	56	38	75
1050	1	827	490	1	0	003	2	336	09544	1260	70	58	65	67	69
1051	1	852	550	1	1	000	2	343	10593	1300	97	87	96	87	99
1052	1	654	550	1	0	000	6	367	08899	1020	57	77	67	62	52
1053	1	822	560	1	0	004	3	245	08399	1100	76	74	81	84	61
1054	1	661	560	1	0	007	6	275	06925	0880	35	75	68	23	59
1055	1	750	590	1	0	000	1	274	06958	0940	59	65	54	60	57
1056	1	734	590	1	0	000	1	342	07463	0950	35	57	42	46	28
1057	1	778	590	1	0	008	1	341	08090	0990	52	62	52	69	34
1058	0	657	590	1	0	000	7	221	08512	1200	68	54	66	69	61
1059	1	821	590A	1	0	001	6	272	08728	1130	79	62	56	96	52
1060	1	708	595	1	0	000	2	302	07826	1100	65	63	72	50	76
1061	1	682	600	1	0	006	5	248	07057	0900	33	75	72	24	52
1062	1	851	600	1	1	000	2	279	07783	1040	49	57	59	50	48
1063	1	815	620	1	0	000	5	268	09100	1090	70	52	65	55	80
1064	1	799	640	1	0	002	1	260	09067	1218	86	67	65	97	66
1065	0	499	640	1	0	005	3	252	08331	1123	67	46	63	53	76
1066	1	680	640	1	0	000	1	237	08515	1120	69	45	36	90	41
1067	1	857	640	1	0	043	5	200	07228	0880	51	63	43	69	33
1068	1	825	720	1	0	000	1	190	08737	1321	75	71	82	62	80
1069	0	348	745	1	0	000	3	288	08804	1100	69	95	97	44	88
1070	1	736	765	1	1	000	5	280	07934	0900	52	54	58	36	75

Data 1--continued

1071	1	707	770	1	0	001	3	258	09212	1150	84	65	79	74	86
1072	1	659	770	1	0	000	3	238	10184	1170	92	80	81	98	78
1073	0	445	775	1	0	000	1	264	08238	1123	53	54	31	90	17
1074	1	706	785	1	0	000	2	320	09348	1270	81	88	91	57	92
1075	1	931	865	1	1	000	7	255	07549	0990	50	45	57	48	54
1076	1	819	867	1	0	000	3	291	08139	1110	57	74	89	26	90
1077	1	789	880	1	0	000	3	269	08615	1190	49	57	54	67	31
1078	1	751	915	1	0	000	7	212	07842	1053	45	78	65	53	41
1079	1	995	925	1	0	020	7	226	07566	0973	50	85	79	50	52

DATA SET 2

SUBJ	R	PERF	DET	S	A	FLY	M	GPA	*GIS*	SATE	AA	PL	NV	VB	QT
2001	1	786	010	1	0	002	3	324	09054	1123	53	86	84	57	52
2002	1	750	010	1	0	008	1	210	08506	0973	59	86	73	60	57
2003	1	702	060	1	0	000	4	220	08390	1053	61	86	81	55	64
2004	1	781	090	1	0	007	3	327	08845	1048	63	54	69	46	78
2005	0	377	115	1	0	000	5	304	08423	1080	52	52	59	38	71
2006	1	515	115	1	0	008	3	301	09233	1150	82	56	66	77	80
2007	1	799	115	1	0	020	5	324	09081	1080	57	69	64	55	59
2008	1	778	130	1	1	032	1	384	11562	1361	91	77	78	98	76
2010	1	765	150	1	0	002	2	308	09030	1110	81	76	81	74	80
2011	1	725	150	1	0	000	1	263	09759	1370	95	91	94	97	90
2012	1	903	150	1	0	015	1	246	08638	1010	65	78	69	72	54
2013	1	821	150	1	0	000	6	282	08196	1100	62	86	89	55	66
2014	1	784	150	1	0	003	3	346	10192	1270	86	85	84	86	80
2015	1	837	150	1	1	007	3	230	07329	0980	52	66	66	48	59
2016	0	000	150	1	0	000	3	248	07613	1000	57	70	87	27	88
2017	1	804	150	1	0	002	5	277	08371	0880	47	61	45	48	44
2018	1	683	150	1	0	000	1	292	08684	1150	71	61	53	81	57
2019	1	840	150	1	0	006	1	299	07680	0950	27	70	66	30	33
2020	1	826	157	1	0	000	4	324	09339	1090	57	70	59	50	64
2021	1	678	157	1	0	000	4	238	07905	1090	51	58	65	50	54
2022	1	761	157	1	0	000	4	255	08237	1090	71	75	48	97	34
2023	1	837	157	1	0	027	6	258	07528	1053	37	62	44	33	48

Data Set 2--continued

2024	1	832	157	1	0	007	3	348	08199	0936	44	71	76	40	54
2025	1	823	157	1	0	000	3	265	08051	1110	61	70	64	64	54
2026	1	683	157	1	0	019	4	283	07651	1000	50	66	67	44	59
2027	1	740	157	1	1	000	6	339	10111	1270	86	88	89	74	90
2028	1	792	157	1	0	010	4	267	09607	1170	81	88	93	69	85
2029	1	768	158	1	0	000	3	311	08989	1230	72	94	92	55	85
2030	0	437	158	1	0	007	5	330	09926	1200	75	58	55	84	59
2031	1	734	158	1	0	000	2	363	09459	1190	68	79	81	55	76
2032	1	702	158	1	0	000	2	278	07960	1060	43	60	56	44	45
2033	1	774	158	1	0	001	2	214	09266	1200	83	70	84	74	85
2034	1	787	165	1	0	000	5	340	07983	1090	45	46	53	36	61
2035	1	800	205	1	0	030	3	230	08559	1123	72	82	70	95	40
2036	1	793	205	1	0	000	3	332	09342	1218	68	89	81	64	66
2037	1	769	205	1	0	000	5	232	08261	1015	68	79	83	57	75
2038	0	000	215	1	0	000	2	380	11218	1350	93	77	88	90	90
2039	1	740	215	1	0	000	7	261	08501	1053	54	69	72	67	43
2040	0	532	220	1	0	000	1	318	09326	1218	75	76	61	84	59
2041	0	433	220	1	0	000	3	323	09810	1270	91	53	69	87	88
2043	1	962	220	1	0	000	3	270	10127	1502	97	94	94	98	93
2044	1	748	225	1	1	000	3	230	08342	1220	71	56	74	55	82
2045	1	783	250	1	0	000	3	369	09505	1218	79	69	80	50	93
2046	1	730	250	1	0	000	3	233	08035	1080	69	80	81	62	71
2047	1	783	255	1	0	041	2	360	09992	1270	88	80	82	86	85
2048	1	708	355	1	0	005	5	229	07772	1130	59	54	51	67	48

Data Set 2--continued

2049	1	808	365	1	1	000	3	300	09714	1320	90	71	82	86	88
2050	1	735	370	1	1	000	5	263	08415	1110	47	55	77	26	76
2051	0	370	370	1	0	000	1	267	09045	1130	78	65	66	86	61
2052	0	000	370	1	0	000	1	227	08271	1190	63	77	67	86	34
2053	1	728	425	1	0	010	3	246	08885	1270	81	88	83	78	76
2054	1	854	425	1	0	000	6	245	09688	1218	69	79	78	47	85
2055	0	000	425	1	0	000	3	305	09942	1361	83	96	79	92	66
2056	1	851	425	1	0	021	5	231	07435	1090	38	75	53	44	38
2057	1	734	425	1	0	002	3	247	08913	1218	84	73	75	96	64
2058	1	751	432	1	0	003	6	280	07649	0942	31	75	60	33	34
2059	1	686	442	1	0	000	3	286	08100	0985	52	75	73	50	57
2060	1	813	442	1	0	010	5	265	09650	1112	75	85	88	62	80
2061	1	682	465	1	0	001	1	308	09146	1053	76	65	62	84	61
2062	1	995	485	1	0	023	1	189	07428	0980	53	93	87	48	61
2063	1	701	536	1	0	060	3	294	08835	1240	76	82	62	74	71
2064	1	770	536	1	0	000	3	236	07856	1130	47	55	67	38	61
2065	1	817	550	1	0	000	3	394	10759	1240	85	64	91	67	92
2066	1	625	560	1	0	011	1	227	06862	0930	43	63	45	50	38
2067	1	847	560	1	1	010	3	383	10351	1150	68	61	79	53	78
2068	1	851	560	1	1	000	7	289	09146	1020	71	59	81	49	76
2069	1	761	560	1	0	029	3	260	07368	1020	72	69	71	69	71
2070	1	831	585	1	0	003	2	357	11674	1450	97	86	91	99	91
2071	1	754	585	1	0	000	3	282	09651	1320	99	84	91	99	97
2072	1	881	590A	1	0	044	1	209	07089	0815	25	71	65	26	33

Data Set 2--continued

2073	0	466	595	1	0	000	3	243	09853	1280	90	76	84	92	82
2074	0	000	600	1	0	000	1	383	09998	0940	69	56	47	78	54
2075	1	713	605	1	0	000	6	217	06991	0800	31	51	57	23	52
2076	1	733	670	1	0	000	1	248	08208	1015	38	51	43	33	52
2077	1	689	720	1	0	000	3	283	10015	1450	95	84	95	90	94
2078	1	670	720	1	0	000	5	289	10211	1310	91	77	80	84	91
2079	1	808	720	1	0	060	1	265	09999	1240	93	87	87	93	88
2080	1	735	720	1	0	000	7	293	10022	1220	84	69	81	77	85
2081	0	466	720	1	0	000	2	297	09338	1310	81	63	63	77	78
2082	1	898	730	1	0	000	3	309	10192	1320	81	94	95	72	82
2083	1	814	752	1	1	000	1	238	09353	1330	92	75	76	97	80
2085	1	554	752	1	1	000	7	239	08002	1110	65	82	86	60	66
2086	0	505	755	1	0	002	6	277	07298	1093	35	61	53	30	48
2087	1	839	765	1	0	028	5	221	07749	1123	37	62	51	44	34
2088	0	390	770	1	0	000	3	286	08745	1170	62	50	48	67	54
2089	1	693	770	1	1	000	3	247	08873	1160	75	58	73	69	75
2090	1	854	772	1	0	000	2	247	07477	1010	23	62	45	26	28
2091	1	704	915	1	0	004	3	309	09115	1053	63	64	69	60	64
2092	1	653	915	1	0	002	3	296	09760	1170	68	64	72	69	61
2093	1	664	915	1	0	000	5	317	08883	1123	75	84	82	55	86
2094	1	775	915	1	1	000	3	253	08526	1218	71	97	96	72	66

DATA SET 3

SUBJ	R	PERF	DET	S	A	FLY	M	GPA	*GIS*	SATE	AA	PL	NV	VB	QT
3001	1	748	012	1	0	000	1	253	08236	0985	52	71	46	72	33
3002	1	676	015	1	0	035	5	200	07122	0985	52	79	75	32	78
3003	1	845	017	1	0	061	5	245	08759	1080	95	96	94	90	94
3004	1	622	019	1	0	001	7	249	07195	0855	31	41	38	38	31
3005	1	765	019	1	0	013	5	217	07676	1048	63	65	74	53	71
3006	1	790	019	1	0	004	5	282	07815	0892	37	62	49	30	54
3007	1	840	019	1	0	005	5	352	07966	0954	47	70	72	44	54
3009	1	757	035	1	0	000	7	330	09364	1165	83	86	90	78	80
3011	1	793	035	1	0	030	3	280	08428	0985	52	71	68	67	38
3012	1	849	045	1	0	000	4	272	07429	0900	40	62	58	53	31
3013	1	798	045	1	1	020	3	329	10890	1440	99	97	94	99	96
3014	1	704	055	1	0	003	1	241	09072	1106	85	66	66	87	76
3015	1	729	055	1	0	002	3	272	09297	1280	88	69	68	99	64
3016	1	621	055	1	1	004	4	282	06994	0835	28	50	50	27	38
3017	1	696	055	1	0	000	1	344	08812	1100	54	57	60	46	66
3018	1	698	075	1	0	000	1	255	07438	0979	51	57	62	50	54
3019	1	757	075	1	0	002	6	399	11028	1230	90	95	91	96	78
3020	1	869	075	1	0	035	7	292	09332	1141	80	64	64	78	75
3021	1	724	075	1	0	005	3	269	07703	0997	54	75	76	55	57
3022	1	784	085	0	1	000	7	289	09155	1130	40	85	82	32	57
3023	1	831	088	1	0	040	7	242	08138	1110	69	60	51	87	43

Data Set 3--continued

3024	1	696	088	1	0	009	5	357	09618	1117	76	82	81	66	80
3025	1	660	088	0	0	014	7	287	10256	1160	84	74	71	86	76
3026	0	521	088	1	0	006	1	287	07855	0930	43	71	70	44	45
3027	1	827	088	1	0	050	3	400	12010	1390	98	86	93	93	98
3028	1	743	105	1	0	000	3	250	07149	1123	35	54	54	32	45
3029	1	797	128	1	0	000	1	243	09175	1250	80	47	56	81	71
3030	1	625	128	1	0	002	6	285	07277	0940	31	57	51	33	34
3031	1	746	128	1	0	078	2	346	08767	1050	68	74	72	77	54
3032	1	735	128	1	1	000	3	280	08978	1050	53	63	67	48	61
3033	1	829	128	1	0	000	6	240	08422	1026	59	53	57	50	66
3035	1	805	150	1	0	004	7	239	08301	1050	52	55	43	53	57
3036	1	796	150	1	0	007	3	378	08685	1130	65	61	79	46	80
3037	1	717	150	1	0	002	7	314	09338	1053	92	83	89	81	93
3038	1	821	158	1	1	000	1	303	08563	0930	67	60	64	53	76
3039	1	822	165	1	0	000	3	300	09542	1200	82	73	80	67	88
3040	1	802	165	0	0	019	2	270	10819	1310	95	86	90	93	92
3041	0	559	172	1	0	000	5	311	08686	1037	61	60	63	60	59
3044	1	797	172	1	0	008	1	297	07484	1010	51	94	75	62	41
3045	1	631	172	1	0	000	7	326	09230	0950	51	50	51	60	43
3046	0	309	172	1	0	001	1	304	07595	0870	40	55	51	41	43
3047	1	612	206	1	1	000	6	228	08456	1250	67	75	86	39	90
3048	1	748	206	1	0	012	7	248	06838	0785	21	44	47	15	41
3049	0	000	206	1	0	003	5	265	07345	0899	38	62	61	27	58
3050	1	721	206	1	0	010	7	275	06934	0835	28	50	52	30	34

Data Set 3--continued

3051	1	750	215	1	0	007	1	300	08332	1180	45	47	37	72	21
3052	1	740	225	1	0	002	5	226	09135	1230	93	54	58	93	88
3053	0	000	295	1	0	000	1	330	07386	0785	21	46	52	19	23
3054	1	814	305	1	0	019	4	200	07937	1123	59	90	88	41	76
3055	1	744	326	1	0	000	7	200	08675	1170	84	76	81	67	91
3056	1	834	330	1	0	018	1	325	08101	1050	54	51	51	46	66
3057	1	595	330	1	0	000	3	277	09201	1200	88	98	97	74	92
3058	1	811	330	1	0	078	1	254	08570	0990	62	93	80	48	75
3060	1	761	330	1	1	006	1	250	08286	0980	54	71	64	69	41
3061	1	806	330	0	1	064	3	279	08709	1090	44	85	66	55	34
3062	1	697	330	1	0	000	7	264	08806	1160	81	75	70	74	80
3063	1	794	330	0	1	000	5	212	08666	1170	87	95	88	78	88
3064	1	771	330	1	0	000	3	286	08514	1000	78	73	79	55	90
3065	1	741	330	1	0	016	7	254	07335	0990	53	52	46	50	59
3066	1	729	330	1	0	000	3	285	09589	1200	76	54	58	97	43
3067	1	764	330	1	0	014	1	305	09019	1110	70	80	87	50	85
3068	1	860	330	1	0	021	1	275	07584	0830	25	82	62	32	26
3069	0	548	380	1	0	004	1	291	09064	1090	52	53	44	69	34
3070	1	866	390	1	0	010	4	317	08410	0886	36	53	53	26	57
3071	1	882	390	1	0	022	3	307	09731	1270	92	91	94	87	90
3072	1	700	400	1	0	000	3	305	08608	1090	70	83	77	64	71
3073	1	602	410	1	0	000	2	279	08239	1110	63	71	71	55	69
3074	1	795	415	1	0	002	5	290	07120	0899	38	52	45	44	38
3075	1	824	415	1	0	035	1	216	08186	1015	57	75	65	62	52

Data Set 3--continued

3076	1	774	415	1	0	000	3	245	09858	1270	78	96	96	50	93
3077	1	798	420	1	0	013	2	256	08566	1129	78	80	86	62	85
3078	0	406	420	1	0	000	7	297	07794	0942	54	66	60	77	33
3079	1	778	475	1	0	000	5	280	08330	0990	75	63	81	53	88
3080	1	790	475	0	0	011	5	252	09358	1150	71	73	75	64	75
3081	1	810	475	1	0	031	1	232	07079	0980	45	66	51	60	33
3082	1	694	535B	1	0	005	5	267	07575	0800	40	48	48	50	33
3083	1	681	550	1	1	008	3	325	07621	0930	43	53	64	30	64
3084	0	432	607	1	0	000	2	372	10106	1170	84	69	70	81	80
3085	1	653	607	1	1	000	7	246	07496	0886	36	51	64	27	54
3086	1	715	665	1	1	009	7	300	09377	1141	80	85	91	74	78
3087	1	745	665	1	0	003	7	249	07940	1040	65	61	65	55	71
3088	0	361	685	0	0	000	1	234	08725	1090	75	94	84	86	57
3089	1	734	695	1	0	000	5	282	07144	1015	23	51	39	30	24
3090	0	000	695	1	0	000	1	261	08185	1110	68	53	60	86	43
3091	1	719	695	1	0	006	3	278	07266	0930	43	56	58	38	54
3092	1	506	772	1	0	000	5	253	07443	0822	26	67	53	26	34
3093	1	581	772	1	1	000	1	250	08425	1117	76	65	61	86	59
3094	1	810	800	1	0	000	5	301	07633	0911	37	58	63	23	64
3095	1	782	800	1	0	037	5	254	08003	1123	61	67	70	40	80
3096	1	799	800	1	0	000	1	310	10064	1321	97	90	96	97	93
3097	1	737	800	1	0	000	5	317	07454	0973	37	57	62	32	52
3098	1	679	800	1	0	000	3	288	08131	1123	54	51	53	44	69
3099	1	793	820	1	1	000	5	276	07380	0899	38	56	51	46	34

Data Set 3--Continued

3100	1	654	875	1	0	000	7	271	08487	1080	75	65	73	62	80
3101	1	837	875	1	0	000	3	306	09693	1090	68	75	71	67	64
3102	0	000	875	1	0	000	5	224	07076	1050	57	78	80	44	71

APPENDIX B

TABLE 1

LATR Program subjects

Total Number of Subjects	=	Number=79
LATR Results (R)	=	Pass=69, Fail=10, % Fail=12.7
Performance (PERF)	=	Mean=737.795, SD=138.511
Sex (S)	=	Males=73, Females=6, 7.6%
Varsity Athletics (A)	=	Number=7, 8.9%
Prior Flying Experience	=	Number=29, Mean time=12.759
SAT Scores (SAT)	=	Mean=1104.734, SD=132.351
University GPA (GPA)	=	Mean=2.778, SD=45.893
AFROTC Quality Index Score	=	Mean=86.107, SD=10.941
Academic Majors		
Social Science	=	Number=22
Math and Physics	=	Number=11
Engineering	=	Number=19
Aviation Science	=	Number= 2
Business	=	Number=13
Computer Science	=	Number= 4
Other	=	Number= 8
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=65.127, SD=18.516
Pilot	=	Mean=69.620, SD=14.655
Navigator	=	Mean=69.101, SD=16.521
Verbal	=	Mean=62.810, SD=21.149
Quantitative	=	Mean=65.253, SD=19.942

TABLE 2

LATR Program Subjects

Total Number of Subjects	=	Number=90
LATR Results (R)	=	Pass=76, Fail=14, % Fail=15.6
Performance (PERF)	=	Mean=733.753, SD=126.967
Sex (S)	=	Males=90, Females=0
Varsity Athletics (A)	=	Number=12, 13.3%
Prior Flying Experience	=	Number=38, Mean time=15.211
SAT Scores (SAT)	=	Mean=1142.444, SD=139.005
University GPA (GPA)	=	Mean=2.822, SD=47.485
AFROTC Quality Index Score	=	Mean=88.772, SD=10.449
Academic Majors		
Social Science	=	Number=17
Math and Physics	=	Number= 9
Engineering	=	Number=34
Aviation Science	=	Number= 6
Business	=	Number=13
Computer Science	=	Number= 7
Other	=	Number= 4
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=66.978, SD=18.959
Pilot	=	Mean=72.133, SD=12.676
Navigator	=	Mean=72.300, SD=14.449
Verbal	=	Mean=64.278, SD=21.341
Quantitative	=	Mean=66.878, SD=17.964

TABLE 3

LATR Program Subjects

Total Number of Subjects	=	Number=96
LATR Results (R)	=	Pass=85, Fail=11, % Fail=11.5
Performance (PERF)	=	Mean=727.293, SD=110.801
Sex (S)	=	Males=89, Females=7, 7.3%
Varsity Athletics (A)	=	Number=14, 14.6%
Prior Flying Experience	=	Number=54, Mean time=
SAT Scores (SAT)	=	Mean=1054.604, SD=136.967
University GPA (GPA)	=	Mean=2.800, SD=0.411
AFROTC Quality Index Score	=	Mean=84.435, SD=10.181
Academic Majors		
Social Science	=	Number=23
Math and Physics	=	Number= 5
Engineering	=	Number=20
Aviation Science	=	Number= 4
Business	=	Number=21
Computer Science	=	Number= 4
Other	=	Number=19
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=60.344, SD=20.742
Pilot	=	Mean=68.135, SD=14.894
Navigator	=	Mean=67.385, SD=15.531
Verbal	=	Mean=57.990, SD=21.690
Quantitative	=	Mean=61.948, SD=21.058

TABLE 4

All Subjects/Composite Group LATR Program

Total Number of Subjects	=	Number=265
LATR Results (R)	=	Pass=230, Fail=35, % Fail=13.2
Performance (PERF)	=	Mean=732.659, SD=124.758
Sex (S)	=	Males=252, Females=13, 4.9%
Varsity Athletics (A)	=	Number=33, 12.5%
Prior Flying Experience	=	Number=121, Mean time=15.488
SAT Scores (SAT)	=	Mean=1099.381, SD=140.748
University GPA (GPA)	=	Mean=2.801, SD=0.446
AFROTC Quality Index Score	=	Mean=86.407, SD=10.622
Academic Majors		
Social Science	=	Number=62
Math and Physics	=	Number=25
Engineering	=	Number=73
Aviation Science	=	Number=12
Business	=	Number=47
Computer Science	=	Number=15
Other	=	Number=31
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=64.023, SD=19.635
Pilot	=	Mean=69.936, SD=14.153
Navigator	=	Mean=69.566, SD=15.562
Verbal	=	Mean=61.562, SD=21.508
Quantitative	=	Mean=64.608, SD=19.756

TABLE 5

LATR Fail Group (Unsuccessful Subjects Only)

Total Number of Subjects	=	Number=35
LATR Results (R)	=	Fail=35, % Fail=100
Performance (PERF)	=	Mean=452.160, SD=102.853
Sex (S)	=	Males=33, Females=2, 5.7%
Varsity Athletics (A)	=	Number=0
Prior Flying Experience	=	Number=8, Mean time=3.875
SAT Scores (SAT)	=	Mean=1111.800, SD=142.621
University GPA (GPA)	=	Mean=2.882, SD=0.450
AFROTC Quality Index Score	=	Mean=86.907, SD=10.343
Academic Majors		
Social Science	=	Number=11
Math and Physics	=	Number= 3
Engineering	=	Number= 9
Aviation Science	=	Number= 0
Business	=	Number= 7
Computer Science	=	Number= 1
Other	=	Number= 4
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=64.143, SD=17.471
Pilot	=	Mean=66.200, SD=14.465
Navigator	=	Mean=65.457, SD=14.754
Verbal	=	Mean=65.200, SD=22.506
Quantitative	=	Mean=60.457, SD=19.159

TABLE 6

LATR Pass Group (Successful Subjects Only)

Total Number of Subjects	=	Number=230
LATR Results (R)	=	Fail=230
Performance (PERF)	=	Mean=763.148, SD=81.437
Sex (S)	=	Males=219, Females=11, 4.8%
Varsity Athletics (A)	=	Number=33, 14.3%
Prior Flying Experience	=	Number=113, Mean time=16.310
SAT Scores (SAT)	=	Mean=1097.491, SD=140.679
University GPA (GPA)	=	Mean=2.789, SD=44.584
AFROTC Quality Index Score	=	Mean=86.331, SD=10.684
Academic Majors		
Social Science	=	Number=51
Math and Physics	=	Number=22
Engineering	=	Number=64
Aviation Science	=	Number=12
Business	=	Number=40
Computer Science	=	Number=14
Other	=	Number=27
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=64.004, SD=19.979
Pilot	=	Mean=70.504, SD=14.050
Navigator	=	Mean=70.191, SD=15.617
Verbal	=	Mean=61.009, SD=21.349
Quantitative	=	Mean=65.239, SD=19.810

TABLE 7

Prior Flying Experience Group (Greater than 4 Hours)

Total Number of Subjects	=	Number=85
LATR Results (R)	=	Pass=82, Fail=3, % Fail=3.5
Performance (PERF)	=	Mean=778.200, SD=97.293
Sex (S)	=	Males=80, Females=5
Varsity Athletics (A)	=	Number=10
Prior Flying Experience	=	Number=85, Mean time=21.059
SAT Scores (SAT)	=	Mean=1063.965, SD=137.916
University GPA (GPA)	=	Mean=2.773, SD=0.494
AFROTC Quality Index Score	=	Mean=84.416, SD=11.311
Academic Majors		
Social Science	=	Number=21
Math and Physics	=	Number= 5
Engineering	=	Number=23
Aviation Science	=	Number= 6
Business	=	Number=20
Computer Science	=	Number= 2
Other	=	Number= 8
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=59.788, SD=19.446
Pilot	=	Mean=71.400, SD=13.603
Navigator	=	Mean=68.765, SD=14.750
Verbal	=	Mean=58.424, SD=21.062
Quantitative	=	Mean=61.082, SD=20.002

TABLE 8

Zero Flying Experience to 4 Hours Total Experience Group

Number of Subjects	=	Number=170
LATR Results (R)	=	Pass=151, Fail=32, % Fail=21.1
Performance (PERF)	=	Mean=709.888, SD=130.856
Sex (S)	=	Males=172, Females=8
Varsity Athletics (A)	=	Number=23
Prior Flying Experience	=	Number=0, Mean time=0
SAT Scores (SAT)	=	Mean=1116.106 SD=139.334
University GPA (GPA)	=	Mean=2.814, SD=42.332
AFROTC Quality Index Score	=	Mean=87.347, SD=10.178
Academic Majors		
Social Science	=	Number=41
Math and Physics	=	Number=20
Engineering	=	Number=50
Aviation Science	=	Number= 6
Business	=	Number=27
Computer Science	=	Number=13
Other	=	Number=23
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=66.022, SD=19.459
Pilot	=	Mean=69.244, SD=14.391
Navigator	=	Mean=69.944, SD=15.957
Verbal	=	Mean=63.044, SD=21.615
Quantitative	=	Mean=66.272, SD=19.474

TABLE 9

Subjects not Varsity Athletics

Total Number of Subjects	=	Number=232
LATR Results (R)	=	Pass=197, Fail=35, % Fail=15.1
Performance (PERF)	=	Mean=728.748, SD=129.290
Sex (S)	=	Males=222, Females=10, 4.3%
Varsity Athletics (A)	=	Number=0
Prior Flying Experience	=	Number=110, Mean time=15.245
SAT Scores (SAT)	=	Mean=1099.371 SD=138.643
University GPA (GPA)	=	Mean=2.805, SD=0.449
AFROTC Quality Index Score	=	Mean=86.348, SD=10.569
Academic Majors		
Social Science	=	Number=57
Math and Physics	=	Number=23
Engineering	=	Number=63
Aviation Science	=	Number=10
Business	=	Number=41
Computer Science	=	Number=13
Other	=	Number=25
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=64.047, SD=19.614
Pilot	=	Mean=70.043, SD=13.919
Navigator	=	Mean=68.974, SD=15.724
Verbal	=	Mean=62.142, SD=21.381
Quantitative	=	Mean=63.991, SD=19.965

TABLE 10

Varsity Athletics Group

Total Number of Subjects	=	Number=33
LATR Results (R)	=	Pass=33, Fail=0, % Fail=0
Performance (PERF)	=	Mean=758.970, SD=85.324
Sex (S)	=	Males=30, Females=3, 9.1%
Varsity Athletics (A)	=	Number=33 All
Prior Flying Experience	=	Number=11, Mean time=17.909
SAT Scores (SAT)	=	Mean=1099.455, SD=157.081
University GPA (GPA)	=	Mean=2.773, SD=43.222
AFROTC Quality Index Score	=	Mean=86.822, SD=11.145
Academic Majors		
Social Science	=	Number= 5
Math and Physics	=	Number= 2
Engineering	=	Number=10
Aviation Science	=	Number= 2
Business	=	Number= 6
Computer Science	=	Number= 2
Other	=	Number= 6
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=63.848, SD=20.094
Pilot	=	Mean=69.182, SD=15.917
Navigator	=	Mean=73.727, SD=13.884
Verbal	=	Mean=57.485, SD=22.294
Quantitative	=	Mean=68.939, SD=17.902

TABLE 11

Males Only

Total Number of Subjects	=	Number=252
LATR Results (R)	=	Pass=219, Fail=33, % Fail=13.1
Performance (PERF)	=	Mean=732.984, SD=123.730
Sex (S)	=	Males=252, Females=0
Varsity Athletics (A)	=	Number=30, 11.9%
Prior Flying Experience	=	Number=116, Mean time=14.922
SAT Scores (SAT)	=	Mean=1093.052, SD=139.789
University GPA (GPA)	=	Mean=2.802, SD=.449
AFROTC Quality Index Score	=	Mean=85.789, SD=10.372
Academic Majors		
Social Science	=	Number=59
Math and Physics	=	Number=23
Engineering	=	Number=71
Aviation Science	=	Number=12
Business	=	Number=44
Computer Science	=	Number=15
Other	=	Number=28
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=63.298, SD=19.473
Pilot	=	Mean=69.421, SD=13.946
Navigator	=	Mean=69.131, SD=15.587
Verbal	=	Mean=60.690, SD=21.337
Quantitative	=	Mean=64.052, SD=19.735

TABLE 12

Females Only

Total Number of Subjects	=	Number=13
LATR Results (R)	=	Pass=11, Fail=2, % Fail=15.4
Performance (PERF)	=	Mean=726.083, SD=150.176, 12N
Sex (S)	=	Males=0, Females=13
Varsity Athletics (A)	=	Number=3
Prior Flying Experience	=	Number=5, Mean time=28.600
SAT Scores (SAT)	=	Mean=1222.077, SD=99.684
University GPA (GPA)	=	Mean=2.773, SD=0.396
AFROTC Quality Index Score	=	Mean=98.384, SD=8.280

Academic Majors		
Social Science	=	Number=3
Math and Physics	=	Number=2
Engineering	=	Number=2
Aviation Science	=	Number=0
Business	=	Number=3
Computer Science	=	Number=0
Other	=	Number=3

Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=78.077, SD=18.053
Pilot	=	Mean=79.923, SD=15.008
Navigator	=	Mean=78.000, SD=12.845
Verbal	=	Mean=78.462, SD=18.141
Quantitative	=	Mean=75.385, SD=17.552

TABLE 13

Academic Major/Social Science (1)

Total Number of Subjects	=	Number=62
LATR Results (R)	=	Pass=51, Fail=11, % Fail=17.7
Performance (PERF)	=	Mean=728.172, SD=138.085
Sex (S)	=	Males=59, Females=3
Varsity Athletics (A)	=	Number=5, 8.1%
Prior Flying Experience	=	Number=29, Mean time=16.276
SAT Scores (SAT)	=	Mean=1076.145, SD=143.635
University GPA (GPA)	=	Mean=2.734, SD=.459
AFROTC Quality Index Score	=	Mean=85.525, SD=10.293
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=62.629, SD=19.581
Pilot	=	Mean=68.629, SD=14.327
Navigator	=	Mean=64.000, SD=16.049
Verbal	=	Mean=66.968, SD=21.461
Quantitative	=	Mean=56.484, SD=20.024

TABLE 14

Academic Major/Math + Physics (2)

Total Number of Subjects	=	Number=25
LATR Results (R)	=	Pass=22, Fail=3, % Fail=12.0
Performance (PERF)	=	Mean=737.833, SD=111.141
Sex (S)	=	Males=23, Females=2
Varsity Athletics (A)	=	Number=2, 8.0%
Prior Flying Experience	=	Number=10, Mean time=18.100
SAT Scores (SAT)	=	Mean=1178.480, SD=124.811
University GPA (GPA)	=	Mean=3.084, SD=.445
AFROTC Quality Index Score	=	Mean=82.008, SD=11.754
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=72.480, SD=20.337
Pilot	=	Mean=72.840, SD=12.766
Navigator	=	Mean=75.880, SD=14.802
Verbal	=	Mean=67.000, SD=19.904
Quantitative	=	Mean=73.680, SD=19.763

TABLE 15

Major/Engineering (3)

Total Number of Subjects	=	Number=73
LATR Results (R)	=	Pass=64, Fail=9, % Fail=12.3
Performance (PERF)	=	Mean=739.141, SD=121.060
Sex (S)	=	Males=71, Females=2, 2.7%
Varsity Athletics (A)	=	Number=10, 13.7%
Prior Flying Experience	=	Number=30, Mean time=15.300
SAT Scores (SAT)	=	Mean=1165.795, SD=126.144
University GPA (GPA)	=	Mean=2.893, SD=.438
AFROTC Quality Index Score	=	Mean=89.881, SD=9.936
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=71.178, SD=17.083
Pilot	=	Mean=74.260, SD=14.455
Navigator	=	Mean=76.986, SD=12.359
Verbal	=	Mean=66.342, SD=20.817
Quantitative	=	Mean=71.973, SD=17.045

TABLE 16

Major/Aviation Science (4)

Total Number of Subjects	=	Number=12
LATR Results (R)	=	Pass=12, Fail=0, % Fail=0
Performance (PERF)	=	Mean=764.833, SD=78.848
Sex (S)	=	Males=12, Females=0
Varsity Athletics (A)	=	Number=2, 16%
Prior Flying Experience	=	Number=7, Mean time=15.143
SAT Scores (SAT)	=	Mean=999.25, SD=117.407
University GPA (GPA)	=	Mean=2.66, SD=.371
AFROTC Quality Index Score	=	Mean=79.98, SD=8.56

Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=50.167, SD=16.364
Pilot	=	Mean=68.667, SD=13.527
Navigator	=	Mean=63.83, SD=16.061
Verbal	=	Mean=48.667, SD=19.992
Quantitative	=	Mean=33.333, SD=18.208

TABLE 17

Major/Business (5)

Total Number of Subjects	=	Number=47
LATR Results (R)	=	Pass=40, Fail=7, % Fail=14.9
Performance (PERF)	=	Mean=732.756, SD=136.411
Sex (S)	=	Males=44, Females=3
Varsity Athletics (A)	=	Number=6, 12.8%
Prior Flying Experience	=	Number=26, Mean time=17.154
SAT Scores (SAT)	=	Mean=1049.234, SD=129.278
University GPA (GPA)	=	Mean=2.72, SD=.415
AFROTC Quality Index Score	=	Mean=83.069, SD=9.389

Air Force Officer Qualifying Testing

Academic Achievement	=	Mean=57.936, SD=18.927
Pilot	=	Mean=65.468, SD=12.842
Navigator	=	Mean=65.532, SD=14.527
Verbal	=	Mean=51.830, SD=19.492
Quantitative	=	Mean=65.000, SD=19.209

TABLE 18

Academic Major/Computer Science (6)

Total Number of Subjects	=	Number=15
LATR Results (R)	=	Pass=14, Fail=1, % Fail=6.7
Performance (PERF)	=	Mean=724.667, SD=100.723
Sex (S)	=	Males=15, Females=0
Varsity Athletics (A)	=	Number=2, 13.3%
Prior Flying Experience	=	Number=7, Mean time=6.286
SAT Scores (SAT)	=	Mean=1072.133, SD=140.274
University GPA (GPA)	=	Mean=2.875, SD=.529
AFROTC Quality Index Score	=	Mean=84.362, SD=12.169
Air Force Officer Qualifying Testing		
Academic Achievement	=	Mean=55.867, SD=21.057
Pilot	=	Mean=71.000, SD=13.206
Navigator	=	Mean=67.933, SD=15.586
Verbal	=	Mean=50.867, SD=24.175
Quantitative	=	Mean=61.200, SD=18.222

APPENDIX C

```
PERF

    COUNT   MIDPOINT    ONE SYMBOL EQUALS APPROXIMATELY  1.00 OCCURRENCE

        2        322  **
        4        355  ****
        2        388  **
        6        421  ******
        3        454  ***
        1        487  *
        5        520  *****
        4        553  ****
        3        586  ***
        7        619  *******
       13        652  *************
       25        685  *************************
       29        718  *****************************
       36        751  ************************************
       41        784  *****************************************
       37        817  *************************************
       21        850  *********************
        6        883  ******
        5        916  *****
        2        949  **
        3        982  ***
                     I....+....I....+....I....+....I....+....I....+....I
                     0        10        20        30        40        50
                                  HISTOGRAM FREQUENCY

MEAN         732.659     STD ERR        7.813     MEDIAN       751.000
MODE         750.000     STD DEV      124.758     VARIANCE   15564.635
KURTOSIS       1.908     S E KURT       1.092     SKEWNESS      -1.236
S E SKEW        .153     RANGE        686.000     MINIMUM      309.000
MAXIMUM      995.000     SUM       186828.000

VALID CASES      255     MISSING CASES     10
```

```
FLY

    COUNT   MIDPOINT    ONE SYMBOL EQUALS APPROXIMATELY  4.00 OCCURRENCES

      144       -1   ************************************
       36        3   *********
       24        7   ******
       14       11   ****
        8       15   **
        8       19   **
        6       23   **
        2       27   *
        6       31   **
        4       35   *
        2       39   *
        3       43   *
        0       47
        2       51   *
        0       55
        2       59   *
        2       63   *
        0       67
        0       71
        0       75
        2       79   *
                     I....+....I....+....I....+....I....+....I....+....I
                     0        40        80       120       160       200
                                   HISTOGRAM FREQUENCY

MEAN          7.072      STD ERR        .844       MEDIAN        0.0
MODE          0.0        STD DEV      13.744       VARIANCE    188.908
KURTOSIS      8.369      S E KURT      1.993       SKEWNESS      2.768
S E SKEW       .150      RANGE        78.000       MINIMUM       0.0
MAXIMUM      78.000      SUM        1874.000

VALID CASES     265      MISSING CASES     0
```

M

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	1	62	23.4	23.4	23.4
	2	25	9.4	9.4	32.8
	3	73	27.5	27.5	60.4
	4	12	4.5	4.5	64.9
	5	47	17.7	17.7	82.6
	6	15	5.7	5.7	88.3
	7	31	11.7	11.7	100.0
	TOTAL	265	100.0	100.0	

```
COUNT     VALUE    ONE SYMBOL EQUALS APPROXIMATELY  1.50 OCCURRENCES

   62      1.00   *****************************************
   25      2.00   *****************
   73      3.00   *************************************************
   12      4.00   ********
   47      5.00   *******************************
   15      6.00   **********
   31      7.00   *********************
                 I.........I.........I.........I.........I.........I
                 0        15        30        45        60        75
                               HISTOGRAM FREQUENCY
```

MEAN	3.475	STD ERR	.122	MEDIAN	3.000
MODE	3.000	STD DEV	1.989	VARIANCE	3.955
KURTOSIS	-1.028	S E KURT	1.993	SKEWNESS	.358
S E SKEW	.150	RANGE	6.000	MINIMUM	1.000
MAXIMUM	7.000	SUM	921.000		

VALID CASES 265 MISSING CASES 0

```
GPA

    COUNT    MIDPOINT    ONE SYMBOL EQUALS APPROXIMATELY    .80 OCCURRENCES

        2         185  ***
        4         196  *****
        6         207  ********
        9         218  ***********
       19         229  ************************
       23         240  *****************************
       32         251  ****************************************
       20         262  *************************
       22         273  ****************************
       28         284  ***********************************
       22         295  ****************************
       19         306  ************************
        8         317  **********
       15         328  *******************
       11         339  **************
        7         350  *********
        6         361  ********
        3         372  ****
        5         383  ******
        3         394  ****
        1         405  *
                       I....+....I....+....I....+....I....+....I....+....I
                       0         8        16        24        32        40
                                 HISTOGRAM FREQUENCY

MEAN         280.132     STD ERR        2.744     MEDIAN       277.000
MODE         245.000     STD DEV       44.675     VARIANCE    1995.835
KURTOSIS       -.248     S E KURT       1.993     SKEWNESS        .468
S E SKEW        .150     RANGE        211.000     MINIMUM      189.000
MAXIMUM      400.000     SUM        74235.000

VALID CASES      265     MISSING CASES      0
```

```
                         11028          1        .4        .4      98.5
                         11218          1        .4        .4      98.9
                         11562          1        .4        .4      99.2
                         11674          1        .4        .4      99.6
                         12010          1        .4        .4     100.0
                                  -------   -------   -------
                         TOTAL        265     100.0     100.0

  COUNT   MIDPOINT   ONE SYMBOL EQUALS APPROXIMATELY   .60 OCCURRENCES

    13       6954   **********************
    14       7201   ***********************
    20       7448   *********************************
    21       7695   ***********************************
    18       7942   ******************************
    22       8189   *************************************
    26       8436   *******************************************
    24       8683   ****************************************
    16       8930   ***************************
    20       9177   *********************************
    18       9424   ******************************
    12       9671   ********************
    12       9918   ********************
    12      10165   ********************
     4      10412   *******
     4      10659   *******
     5      10906   ********
     1      11153   **
     0      11400
     2      11647   ***
     1      11894   **
                   I....+....I....+....I....+....I....+....I....+....I
                   0         6         12        18        24        30
                              HISTOGRAM FREQUENCY

MEAN        8640.713     STD ERR       65.254     MEDIAN      8526.000
MODE        8002.000     STD DEV     1062.258     VARIANCE 1128392.11
KURTOSIS       -.204     S E KURT       1.993     SKEWNESS        .481
S E SKEW        .150     RANGE       5172.000     MINIMUM     6838.000
MAXIMUM    12010.000     SUM       2289789.00

VALID CASES      265     MISSING CASES      0
```

```
SATE

    COUNT   MIDPOINT    ONE SYMBOL EQUALS APPROXIMATELY   .80 OCCURRENCES

        4        794  *****
        5        829  ******
        8        364  **********
       11        899  **************
       16        934  ********************
       17        969  *********************
       22       1004  ****************************
       23       1039  *****************************
       19       1074  ************************
       36       1109  *********************************************
       21       1144  **************************
       14       1179  ******************
       22       1214  ****************************
       11       1249  **************
       12       1284  ***************
       13       1319  ****************
        5       1354  ******
        2       1389  ***
        1       1424  *
        2       1459  ***
        1       1494  *
                      I....+....I....+....I....+....I....+....I....+....I
                      0         8         16        24        32        40
                                    HISTOGRAM FREQUENCY

MEAN        1099.381      STD ERR        8.646     MEDIAN     1106.000
MODE        1090.000      STD DEV      140.748     VARIANCE  19810.009
KURTOSIS       -.289      S E KURT       1.993     SKEWNESS       .115
S E SKEW        .150      RANGE        717.000     MINIMUM     785.000
MAXIMUM     1502.000      SUM       291336.000

VALID CASES      265      MISSING CASES      0
```

QT

```
 COUNT   MIDPOINT   ONE SYMBOL EQUALS APPROXIMATELY   .60 OCCURRENCES

     1        18  **
     2        22  ***
     3        26  *****
     6        30  **********
    19        34  ********************************
     7        38  ************
    13        42  **********************
     5        46  ********
     5        50  ********
    27        54  *********************************************
    21        58  ***********************************
    12        62  ********************
    21        66  ***********************************
    17        70  ****************************
     9        74  ***************
    19        78  ********************************
    23        82  **************************************
    12        86  ********************
    24        90  ****************************************
    13        94  **********************
     6        98  **********
                  I....+....I....+....I....+....I....+....I....+....I
                  0         6        12        18        24        30
                             HISTOGRAM FREQUENCY

MEAN          64.608     STD ERR        1.214     MEDIAN        64.000
MODE          80.000     STD DEV       19.756     VARIANCE     390.315
KURTOSIS       -.919     S E KURT       1.993     SKEWNESS       -.259
S E SKEW        .150     RANGE         82.000     MINIMUM       17.000
MAXIMUM       99.000     SUM        17121.000

VALID CASES      265     MISSING CASES      0
```

PL

```
                         94          7        2.6        2.6       95.1
                         95          5        1.9        1.9       97.0
                         96          4        1.5        1.5       98.5
                         97          3        1.1        1.1       99.6
                         98          1         .4         .4      100.0
                                -------    -------    -------
                       TOTAL       265      100.0      100.0

COUNT   MIDPOINT   ONE SYMBOL EQUALS APPROXIMATELY   .50 OCCURRENCES

    0       39
    1       42   **
    7       45   **************
    4       48   ********
   16       51   ********************************
   22       54   ********************************************
   22       57   ********************************************
   14       60   ****************************
   19       63   **************************************
   21       66   ******************************************
   15       69   ******************************
   14       72   ****************************
   23       75   **********************************************
   13       78   **************************
   12       81   ************************
   14       84   ****************************
   19       87   **************************************
    6       90   ************
   10       93   ********************
   12       96   ************************
    1       99   **
                I....+....I....+....I....+....I....+....I....+....I
                0         5        10        15        20        25
                          HISTOGRAM FREQUENCY

MEAN         69.936     STD ERR        .369     MEDIAN       69.000
MODE         75.000     STD DEV      14.153     VARIANCE    200.310
KURTOSIS      -.983     S E KURT      1.993     SKEWNESS       .173
S E SKEW       .150     RANGE        57.000     MINIMUM      41.000
MAXIMUM      98.000     SUM       18533.000

VALID CASES     265     MISSING CASES     0
```

NV

```
                         83        4      1.5      1.5     78.5
                         84        6      2.3      2.3     80.8
                         85        2       .8       .8     81.5
                         86        5      1.9      1.9     83.4
                         87        4      1.5      1.5     84.9
                         88        4      1.5      1.5     86.4
                         89        5      1.9      1.9     88.3
                         90        2       .8       .8     89.1
                         91        7      2.6      2.6     91.7
                         92        1       .4       .4     92.1
                         93        3      1.1      1.1     93.2
                         94        5      1.9      1.9     95.1
                         95        3      1.1      1.1     96.2
                         96        7      2.6      2.6     98.9
                         97        2       .8       .8     99.6
                         99        1       .4       .4    100.0
                              -------  -------  -------
                      TOTAL      265    100.0    100.0

COUNT   MIDPOINT    ONE SYMBOL EQUALS APPROXIMATELY   .60 OCCURRENCES

    2     31.33  ***
    1     34.67  **
    4     38.00  *******
    2     41.33  ***
   11     44.67  ******************
    6     48.00  **********
   15     51.33  *************************
   19     54.67  ********************************
   12     58.00  ********************
   19     61.33  ********************************
   30     64.67  **************************************************
   11     68.00  ******************
   18     71.33  ******************************
   19     74.67  ********************************
   13     78.00  **********************
   22     81.33  *************************************
   17     84.67  ****************************
   13     88.00  **********************
   10     91.33  *****************
   18     94.67  ******************************
    3     98.00  *****
                I....+....I....+....I....+....I....+....I....+....I
                0         6         12        18        24        30
                          HISTOGRAM FREQUENCY
```

```
VB

                                    -------  -------  -------
                      TOTAL           265     100.0    100.0

COUNT   MIDPOINT   ONE SYMBOL EQUALS APPROXIMATELY    .50 OCCURRENCES

    1        17  **
    1        21  **
   13        25  **************************
   10        29  ********************
   12        33  ************************
    8        37  ****************
    9        41  ******************
   19        45  **************************************
   23        49  **********************************************
    8        53  ****************
   19        57  **************************************
   15        61  ******************************
    6        65  ************
   25        69  **************************************************
   19        73  **************************************
   12        77  ************************
    7        81  **************
   19        85  **************************************
   13        89  **************************
    7        93  **************
   19        97  **************************************
                I....+....I....+....I....+....I....+....I....+....I
                0         5        10        15        20        25
                          HISTOGRAM FREQUENCY

MEAN          61.562     STD ERR       1.321     MEDIAN      62.000
MODE          55.000     STD DEV      21.509     VARIANCE   462.603
KURTOSIS      -1.005     S E KURT      1.993     SKEWNESS     -.033
S E SKEW        .150     RANGE        84.000     MINIMUM     15.000
MAXIMUM       99.000     SUM       16314.000

VALID CASES      265     MISSING CASES     0
```

AA

87	1	.4	.4	86.4
88	5	1.9	1.9	88.3
89	4	1.5	1.5	89.8
90	3	1.1	1.1	90.9
91	3	1.1	1.1	92.1
92	4	1.5	1.5	93.6
93	4	1.5	1.5	95.1
95	5	1.9	1.9	97.0
97	4	1.5	1.5	98.5
98	1	.4	.4	98.9
99	3	1.1	1.1	100.0
TOTAL	265	100.0	100.0	

```
COUNT   MIDPOINT   ONE SYMBOL EQUALS APPROXIMATELY   .60 OCCURRENCES

    2        20   ***
    4        24   *******
    6        28   **********
    6        32   **********
   14        36   ***********************
    9        40   ***************
   14        44   ***********************
    7        48   ************
   27        52   *********************************************
   14        56   ***********************
   13        60   **********************
   16        64   ***************************
   21        68   ***********************************
   17        72   ****************************
   18        76   ******************************
   18        80   ******************************
   19        84   ********************************
   13        88   **********************
   14        92   ***********************
    9        96   ***************
    4       100   *******
                  I....+....I....+....I....+....I....+....I....+....I
                  0         6         12        18        24        30
                            HISTOGRAM FREQUENCY
```

MEAN	64.023	STD ERR	1.206	MEDIAN	67.000
MODE	52.000	STD DEV	19.635	VARIANCE	385.553
KURTOSIS	-.873	S E KURT	1.993	SKEWNESS	-.206
S E SKEW	.150	RANGE	78.000	MINIMUM	21.000
MAXIMUM	99.000	SUM	16966.000		

VALID CASES 265 MISSING CASES 0

APPENDIX D

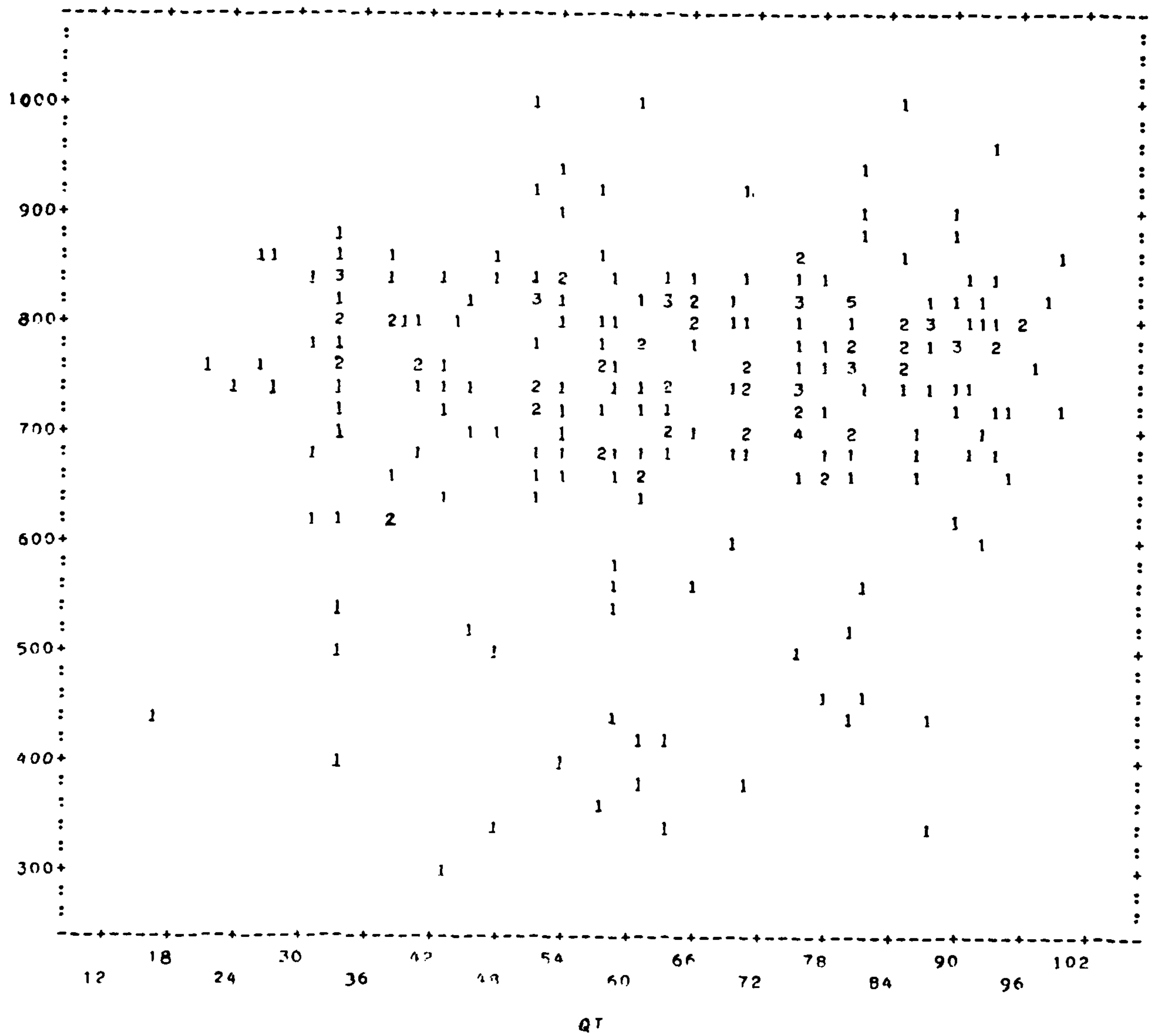
- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	PERF	SATE	GPA	AA	FLY	NEWFLY	PL	NV	VB	QT	GIS
PERF	1.0000	.0330	-.0320	.0198	.2830**	-.2586**	.2291**	.2056**	.0272	.0767	.0588
SATE	.0330	1.0000	.2243**	.8009**	-.0532	.1732*	.4211**	.5532**	.6972**	.6334**	.7963**
GPA	-.0320	.2243**	1.0000	.1894**	-.0520	.0434	.0411	.1367	.1315	.1979**	.5048**
AA	.0198	.8009**	.1894**	1.0000	-.0293	.1485*	.4791**	.6573**	.8459**	.7938**	.8182**
FLY	.2830**	-.0532	-.0520	-.0293	1.0000	-.7006**	.1750*	.0175	.0156	-.0443	-.0196
NEWFLY	-.2586**	.1732*	.0434	.1485*	-.7006**	1.0000	-.0712	.0355	.1005	.1228	.1290
PL	.2291**	.4211**	.0411	.4791**	.1750*	-.0712	1.0000	.8036**	.3582**	.4379**	.4117**
NV	.2056**	.5532**	.1367	.6573**	.0175	.0355	.8036**	1.0000	.3325**	.7765**	.5665**
VB	-.0272	.6972**	.1315	.8459**	.0156	.1005	.3582**	.3325**	1.0000	.3607**	.6970**
QT	.0767	.6334**	.1979**	.7938**	-.0443	.1228	.4379**	.7765**	.3607**	1.0000	.6631**
GIS	.0588	.7963**	.5048**	.8182**	-.0196	.1290	.4117**	.5665**	.6970**	.6631**	1.0000

* - SIGNIF. LE .01   ** - SIGNIF. LE .001   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

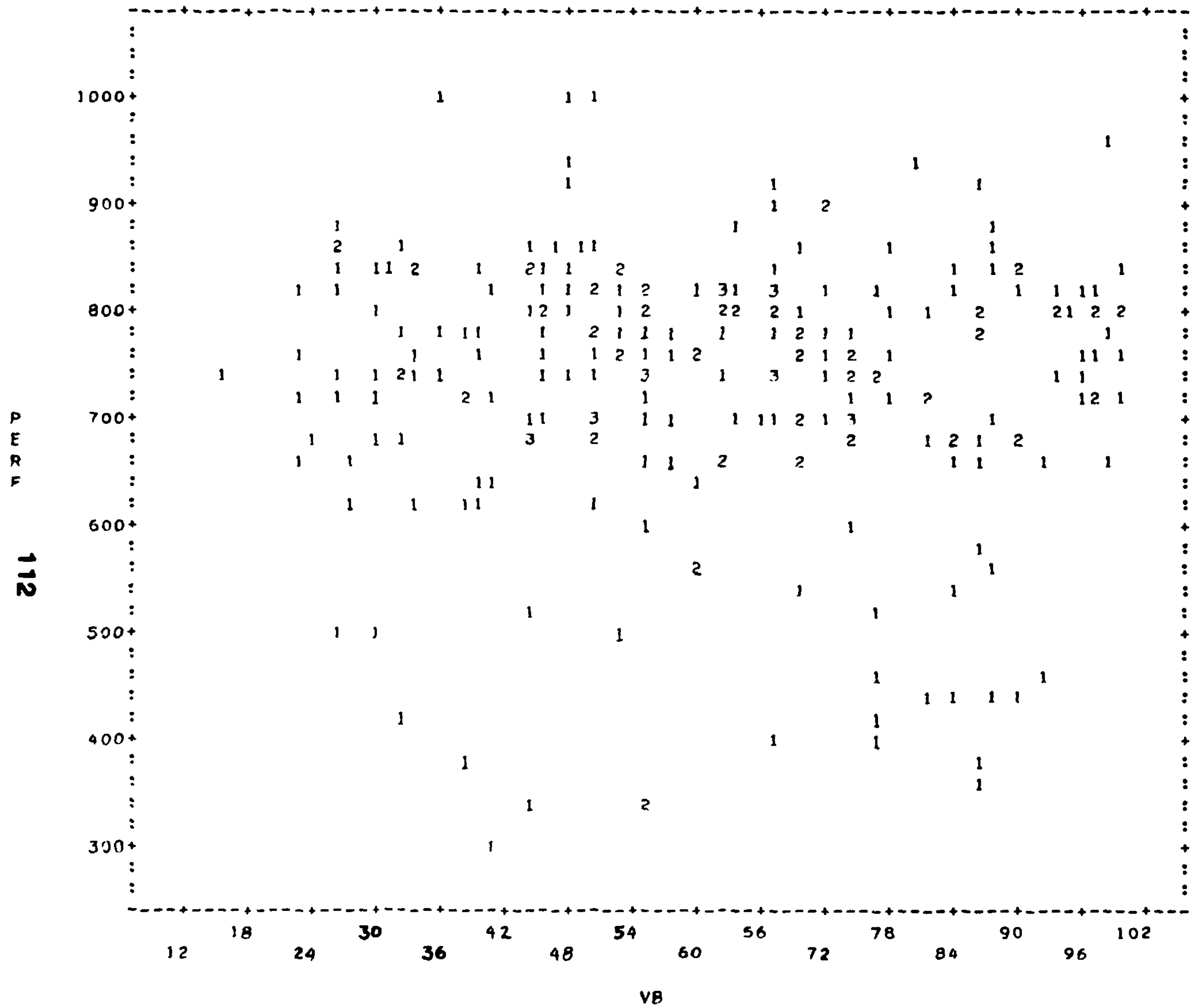
APPENDIX E

PLOT OF PERF WITH QT



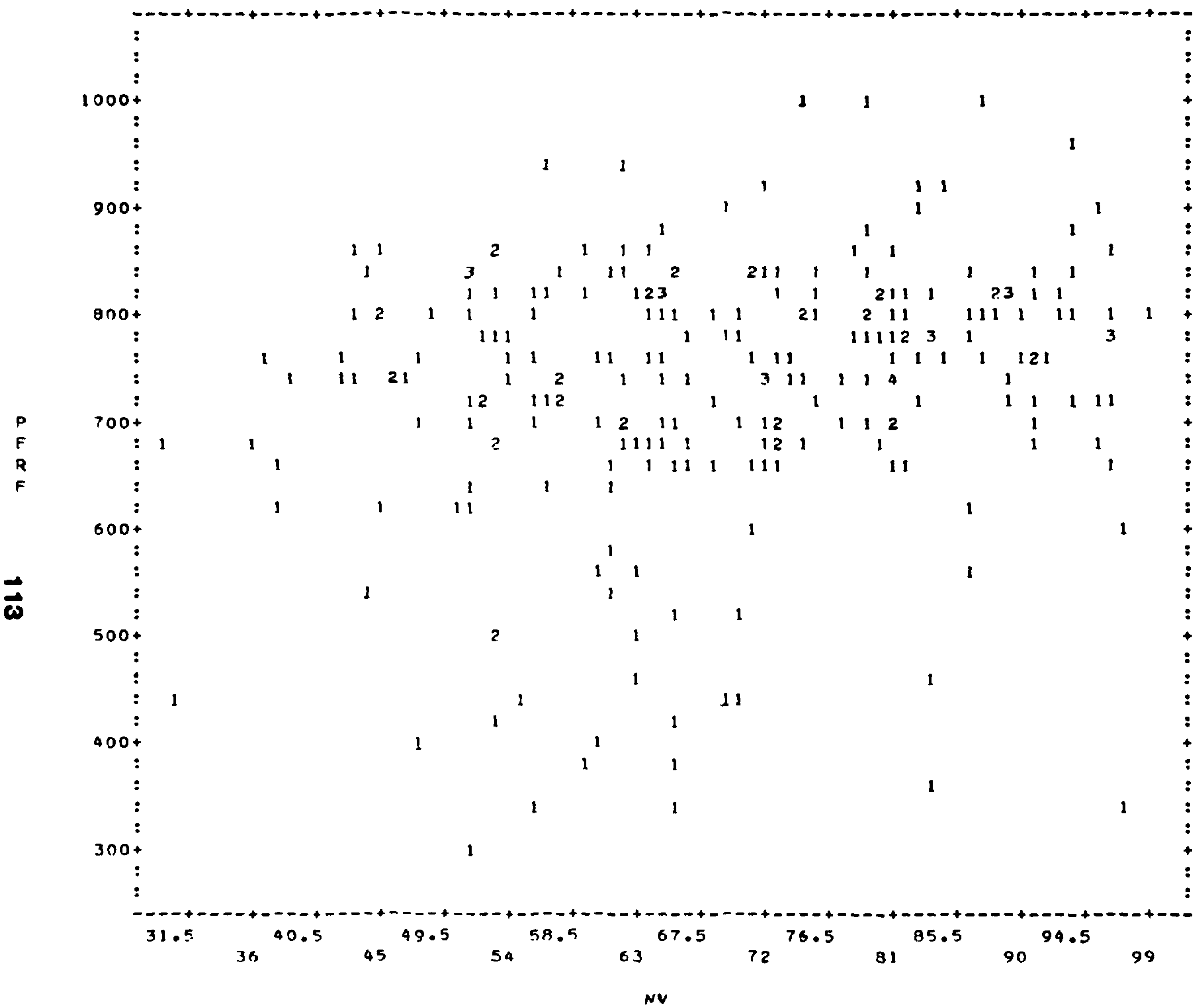
255 CASES PLOTTED.

PLOT OF PERF WITH VB



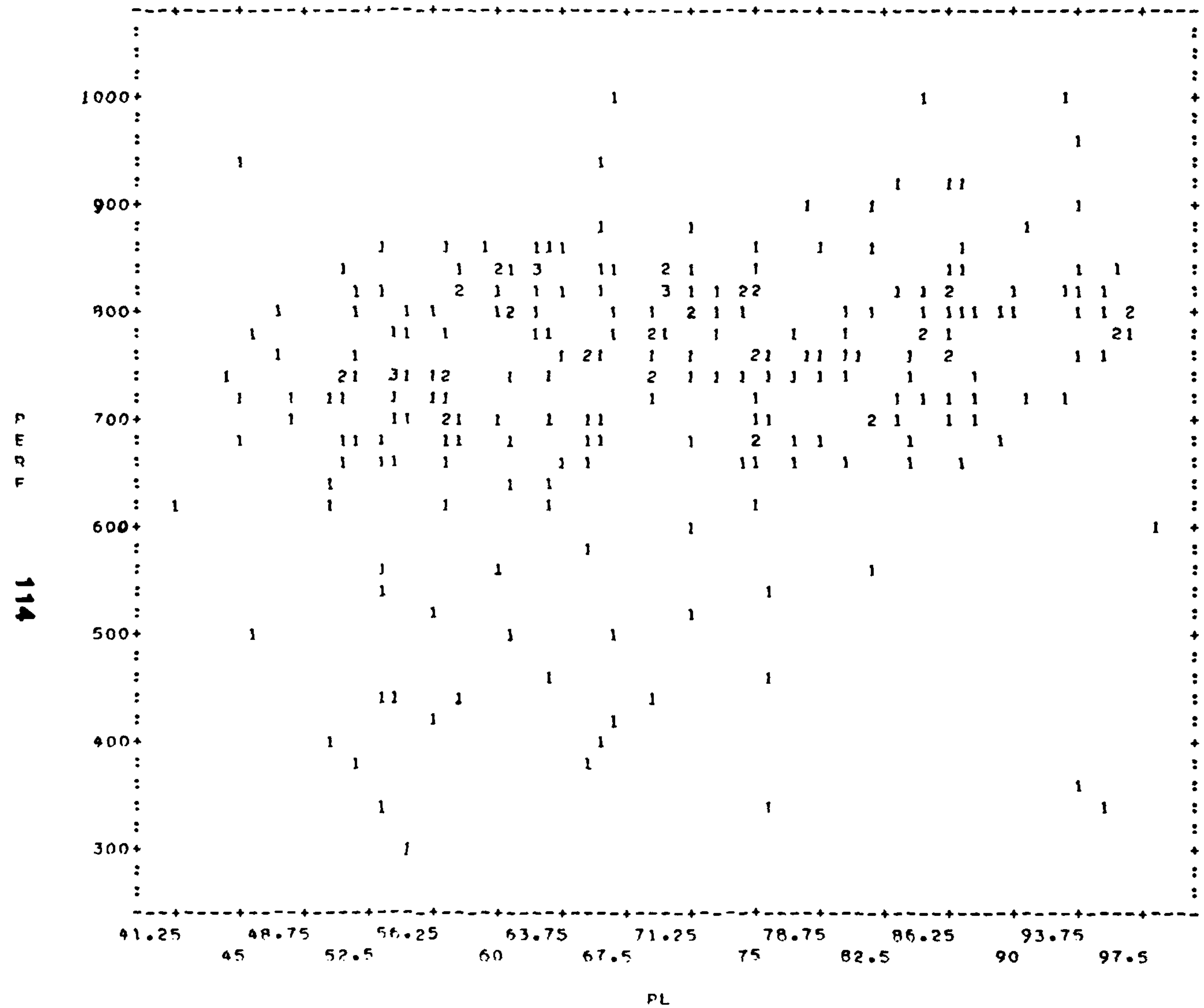
255 CASES PLOTTED.

PLOT OF PERF WITH NV



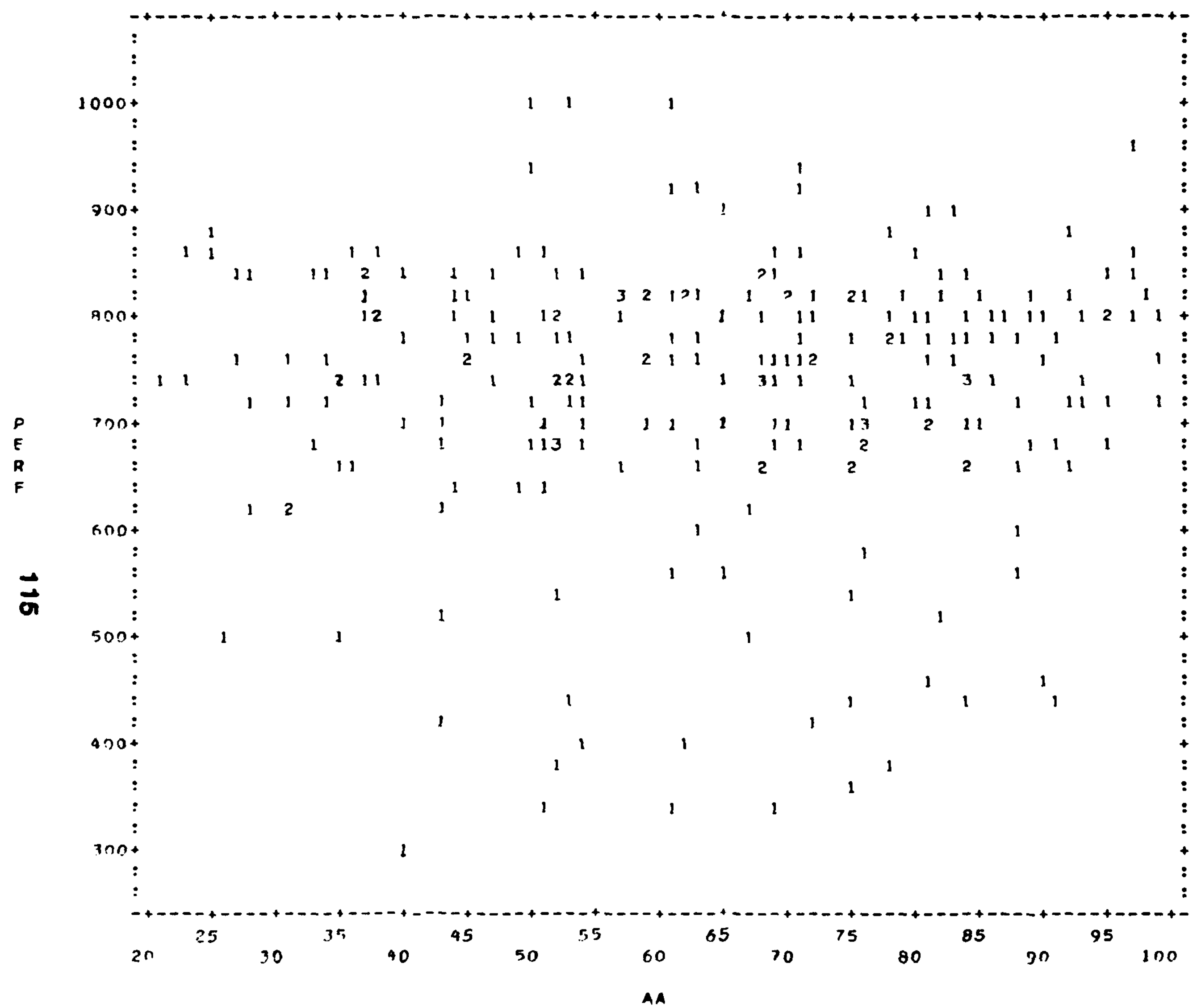
255 CASES PLOTTED.

PLOT OF PERF WITH PL



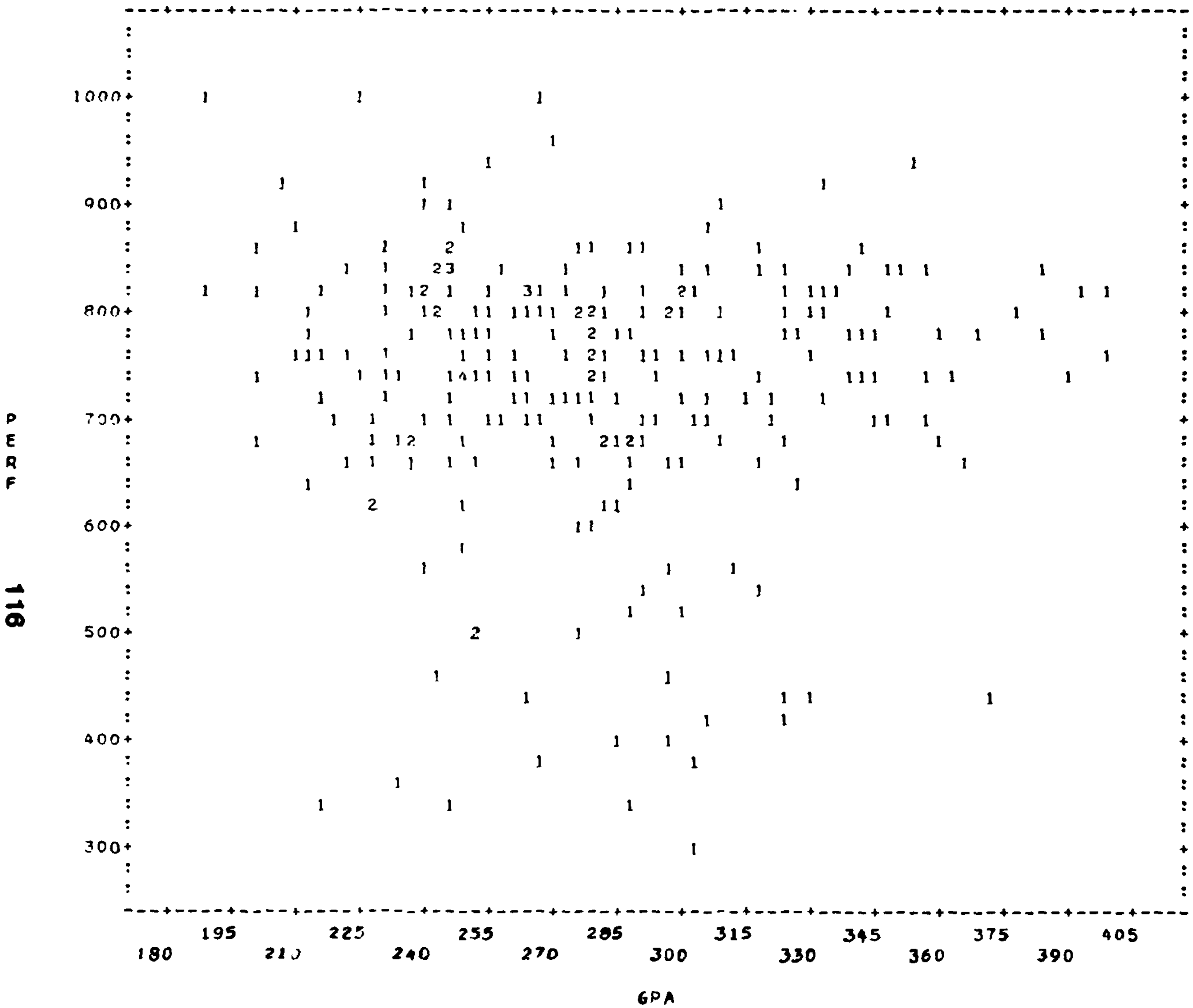
255 CASES PLOTTED.

PLOT OF PERF WITH AA



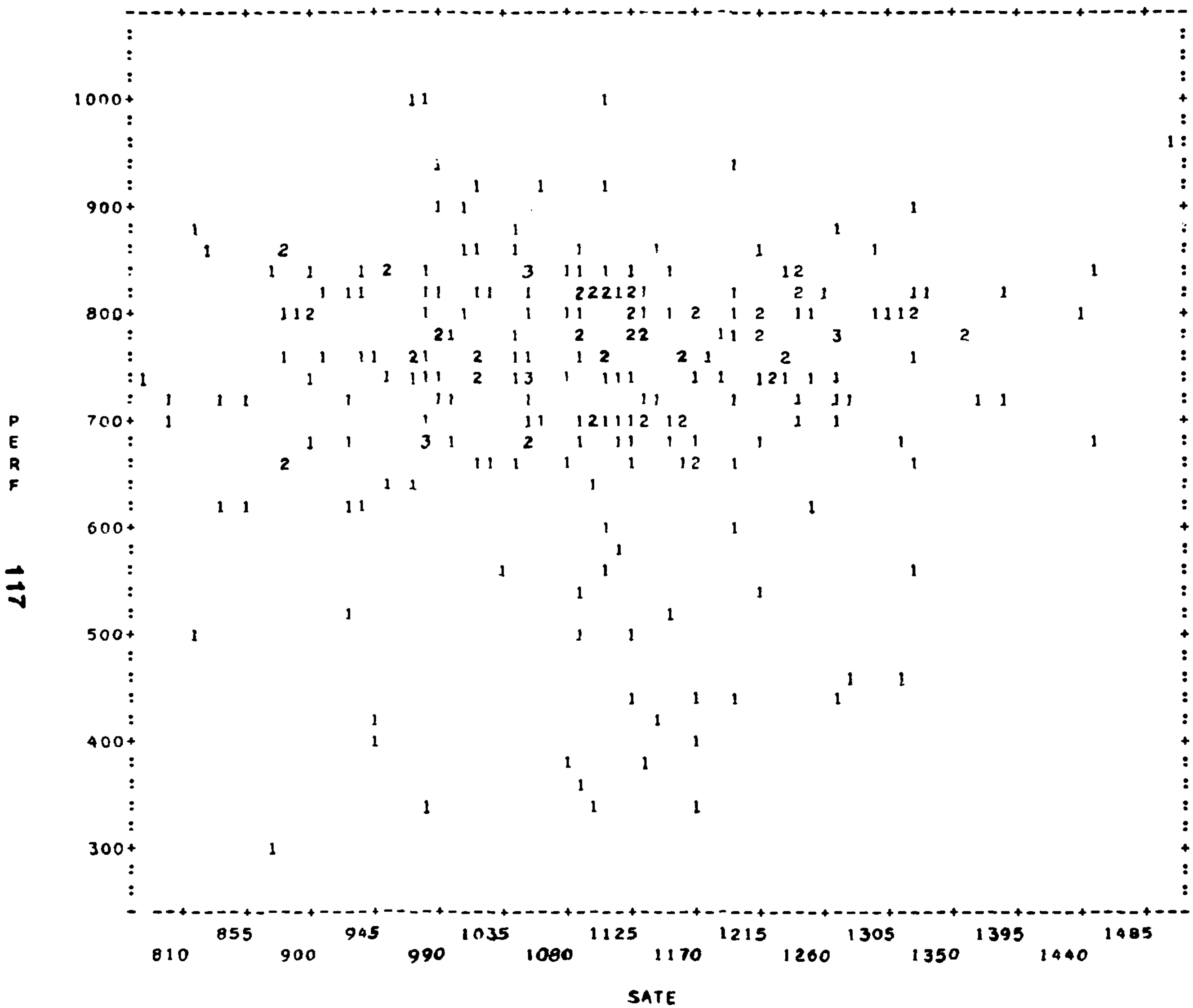
255 CASES PLOTTED.

PLOT OF PERF WITH GPA



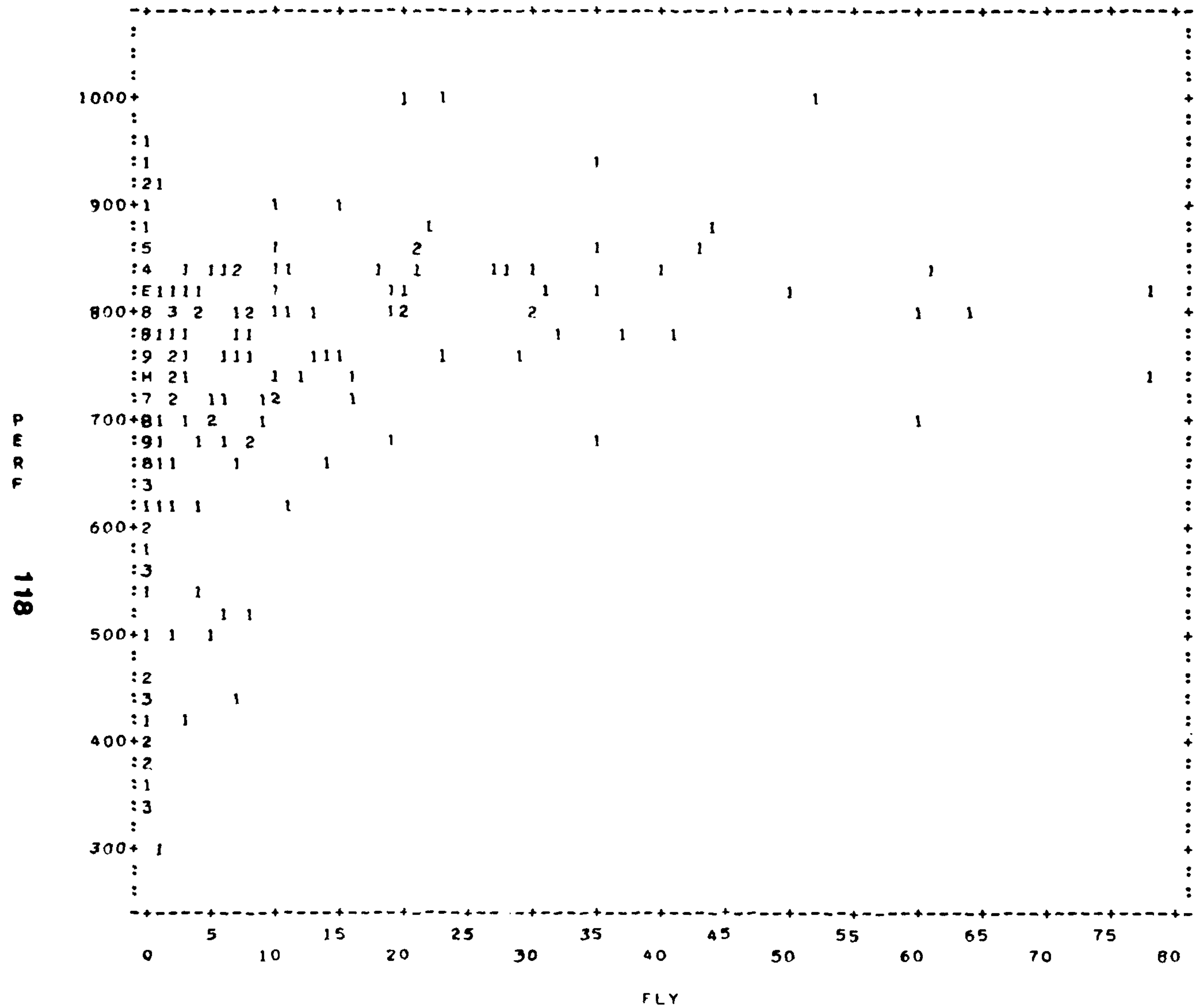
255 CASES PLOTTED.

PLOT OF PERF WITH SATE



255 CASES PLOTTED.

PLOT OF PERF WITH FLY



255 CASES PLOTTED.

```
DATA   INFORMATION

        265 UNWEIGHTED CASES ACCEPTED.

SIZE OF THE PLOTS

   HORIZONTAL SIZE IS 80
     VERTICAL SIZE IS 40

FREQUENCIES AND SYMBOLS USED (NOT APPLICABLE FOR CONTROL OR OVERLAY PLOTS)

          1 - 1       11 - B      21 - L      31 - V
          2 - 2       12 - C      22 - M      32 - W
          3 - 3       13 - D      23 - N      33 - X
          4 - 4       14 - E      24 - O      34 - Y
          5 - 5       15 - F      25 - P      35 - Z
          6 - 6       16 - G      26 - Q      36 - *
          7 - 7       17 - H      27 - R
          8 - 8       18 - I      28 - S
          9 - 9       19 - J      29 - T
         10 - A       20 - K      30 - U
```

APPENDIX F

T - T E S T

GROUP 1 - R EQ 0.
GROUP 2 - R EQ 1.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	POOLED DEGREES OF FREEDOM	POOLED 2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	SEPARATE DEGREES OF FREEDOM	SEPARATE 2-TAIL PROB.
FLY	GROUP 1	35	0.8857	1.891	0.320	58.89	0.	-2.90	263	0.004	-7.07	261.06	0.000
	GROUP 2	230	8.0130	14.509	0.957								
SATE	GROUP 1	35	1111.8000	142.621	24.107	1.03	0.865	0.56	263	0.576	0.55	44.67	0.582
	GROUP 2	230	1097.4913	140.679	9.276								
GPA	GROUP 1	35	288.2286	45.069	7.618	1.02	0.883	1.15	263	0.251	1.14	44.73	0.259
	GROUP 2	230	276.9000	44.584	2.940								
AA	GROUP 1	35	64.1429	17.471	2.953	1.31	0.352	0.04	263	0.969	0.04	48.59	0.966
	GROUP 2	230	64.0043	19.979	1.317								
PL	GROUP 1	35	66.2000	14.465	2.445	1.06	0.773	-1.68	263	0.094	-1.65	44.33	0.107
	GROUP 2	230	70.5043	14.050	0.926								
NV	GROUP 1	35	65.4571	14.754	2.494	1.12	0.715	-1.68	263	0.094	-1.75	46.38	0.086
	GROUP 2	230	70.1913	15.617	1.030								
VB	GROUP 1	35	65.2000	22.506	3.804	1.11	0.635	1.07	263	0.284	1.03	43.83	0.307
	GROUP 2	230	61.0087	21.349	1.408								

T - T E S T

GROUP 1 - R EQ 0.
GROUP 2 - R EQ 1.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
QT	GROUP 1	35	60.4571	19.159	3.239	1.07	0.849	-1.34	263	0.183	-1.37	45.78	0.178
	GROUP 2	230	65.2391	19.810	1.306								
GIS	GROUP 1	35	8690.7143	1034.383	174.843	1.07	0.855	0.30	263	0.766	0.31	45.76	0.761
	GROUP 2	230	8633.1043	1068.437	70.451								
PERF	GROUP 1	25	452.1600	102.853	20.571	1.60	0.086	-17.64	253	0.000	-14.63	27.37	0.
	GROUP 2	230	763.1478	91.437	5.370								

T - T E S T

GROUP 1 - A EQ 0.
GROUP 2 - A EQ 1.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	POOLED DEGREES OF FREEDOM	POOLED 2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	SEPARATE DEGREES OF FREEDOM	SEPARATE 2-TAIL PROB.
PERF	GROUP 1	222	720.7477	129.290	8.677	2.30	0.006	-1.30	253	0.195	-1.76	56.62	0.084
	GROUP 2	33	758.9697	85.324	14.853								
SATE	GROUP 1	232	1099.3707	138.643	9.102	1.28	0.303	-0.00	263	0.997	-0.00	39.42	0.998
	GROUP 2	33	1099.4545	157.081	27.344								
GPA	GROUP 1	232	280.5216	44.955	2.951	1.08	0.823	0.38	263	0.707	0.39	42.47	0.701
	GROUP 2	33	277.3939	43.222	7.524								
AA	GROUP 1	232	64.0474	19.614	1.288	1.05	0.803	0.05	263	0.957	0.05	41.16	0.958
	GROUP 2	33	63.8485	20.094	3.498								
PL	GROUP 1	232	70.0431	13.919	0.914	1.31	0.269	0.33	263	0.744	0.30	39.28	0.769
	GROUP 2	33	69.1818	15.917	2.771								
NV	GROUP 1	232	68.9741	15.724	1.032	1.28	0.404	-1.65	263	0.101	-1.81	44.54	0.077
	GROUP 2	33	73.7273	13.884	2.417								
VB	GROUP 1	232	62.1422	21.381	1.404	1.09	0.701	1.16	263	0.245	1.13	40.82	0.266
	GROUP 2	33	57.4848	22.294	3.881								

T - T E S T

GROUP 1 - A EQ 0.
GROUP 2 - A EQ 1.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
QT	GROUP 1	232	63.9914	19.965	1.311	1.24	0.468	-1.35	263	0.179	-1.46	44.13	0.150
	GROUP 2	33	68.9394	17.902	3.116								
GIS	GROUP 1	232	8634.8103	1056.985	69.394	1.11	0.639	-0.24	263	0.811	-0.23	40.62	0.819
	GROUP 2	33	8682.2121	1114.585	194.024								
FLY	GROUP 1	232	7.2284	13.870	0.911	1.14	0.672	0.49	263	0.623	0.52	43.09	0.608
	GROUP 2	33	5.9697	12.975	2.259								

- T - T E S T -

GROUP 1 - NEWFLY EQ 1.00
GROUP 2 - NEWFLY EQ 2.00

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
PERF	GROUP 1	85	778.2000	97.293	10.553	1.81	0.003	4.26	253	0.000	4.69	216.60	0.000
	GROUP 2	170	709.8882	130.856	10.036								
SATE	GROUP 1	85	1063.9647	137.916	14.959	1.02	0.931	-2.85	263	0.005	-2.86	166.35	0.005
	GROUP 2	180	1116.1056	132.334	10.385								
GPA	GROUP 1	85	277.3176	49.419	5.360	1.36	0.089	-0.70	263	0.482	-0.67	144.17	0.506
	GROUP 2	180	281.4611	42.332	3.155								
AA	GROUP 1	85	59.7882	19.446	2.109	1.00	1.000	-2.43	263	0.016	-2.44	164.92	0.016
	GROUP 2	180	66.0222	19.459	1.450								
PL	GROUP 1	85	71.4000	13.603	1.475	1.12	0.566	1.16	263	0.248	1.18	173.50	0.239
	GROUP 2	180	69.2444	14.391	1.073								
NV	GROUP 1	85	68.7667	14.750	1.600	1.17	0.419	-0.58	263	0.566	-0.59	177.11	0.555
	GROUP 2	180	69.9444	15.957	1.189								
VB	GROUP 1	85	58.4235	21.062	2.284	1.05	0.800	-1.64	263	0.103	-1.65	168.75	0.100
	GROUP 2	180	63.0444	21.615	1.611								

T - T E S T

GROUP 1 - NEWFLY EQ 1.00
GROUP 2 - NEWFLY EQ 2.00

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
QT	GROUP 1	85	61.0824	20.002	2.170	1.05	0.757	-2.01	263	0.046	-1.99	160.90	0.048
	GROUP 2	180	66.2722	19.474	1.451								
GIS	GROUP 1	85	8441.6235	1131.166	122.692	1.24	0.245	-2.11	263	0.036	-2.03	150.21	0.044
	GROUP 2	180	8734.7278	1017.869	75.867								

T - T E S T

GROUP 1 - SEX EQ 0.
GROUP 2 - SEX EQ 1.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
PERF	GROUP 1	12	726.0833	150.176	43.352	1.47	0.284	-0.19	253	0.852	-0.16	11.75	0.878
	GROUP 2	243	732.9835	123.730	7.937								
SATE	GROUP 1	13	1222.0769	99.684	27.647	1.97	0.183	3.28	263	0.001	4.45	14.55	0.001
	GROUP 2	252	1093.0516	139.789	8.806								
GPA	GROUP 1	13	277.3846	39.671	11.003	1.29	0.653	-0.23	263	0.821	-0.25	13.64	0.803
	GROUP 2	252	280.2738	44.984	2.834								
AA	GROUP 1	13	78.0769	18.053	5.007	1.16	0.822	2.68	263	0.008	2.87	13.48	0.013
	GROUP 2	252	63.2976	19.473	1.227								
PL	GROUP 1	13	79.9231	15.008	4.163	1.16	0.628	2.64	263	0.009	2.47	13.09	0.028
	GROUP 2	252	69.4206	13.946	0.879								
NV	GROUP 1	13	78.0000	12.845	3.563	1.47	0.458	2.02	263	0.045	2.40	13.89	0.031
	GROUP 2	252	69.1310	15.587	0.982								
VB	GROUP 1	13	78.4615	18.141	5.031	1.38	0.543	2.95	263	0.003	3.41	13.77	0.004
	GROUP 2	252	60.6905	21.337	1.344								

T - T E S T

GROUP 1 - SEX EQ 0.
GROUP 2 - SEX EQ 1.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
QT	GROUP 1	13	75.3846	17.552	4.868	1.26	0.681	2.03	263	0.043	2.26	13.61	0.041
	GROUP 2	252	64.0516	19.735	1.243								
GIS	GROUP 1	13	9838.4615	828.082	229.669	1.57	0.381	4.31	263	0.000	5.27	14.02	0.000
	GROUP 2	252	8578.9246	1037.264	65.341								
FLY	GROUP 1	13	11.0000	19.205	5.327	2.05	0.042	1.06	263	0.291	0.77	12.61	0.458
	GROUP 2	252	6.8690	13.425	0.846								

APPENDIX G

```
                SEX
       COUNT   :
       ADJ RES :                      ROW
               :                      TOTAL
               :       0:       1:
R      --------+--------+--------+
            0  :     2  :    33  :     35
               :    .2  :   -.2  :   13.2%
               +--------+--------+
            1  :    11  :   219  :    230
               :   -.2  :    .2  :   86.8%
               +--------+--------+
        COLUMN      13      252       265
         TOTAL    4.9%    95.1%    100.0%
```

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.	1	1.0000	1.717	1 OF 4 (25.0%)
0.05652	1	0.8121	(BEFORE YATES CORRECTION)	

STATISTIC	SYMMETRIC	WITH R DEPENDENT	WITH SEX DEPENDENT
LAMBDA	0.	0.	0.
UNCERTAINTY COEFFICIENT	0.00035	0.00026	0.00052
SOMERS' D	0.01324	0.02289	0.00932
ETA		0.01460	0.01460

STATISTIC	VALUE	SIGNIFICANCE
PHI	0.01460	
CONTINGENCY COEFFICIENT	0.01460	
KENDALL'S TAU B	0.01460	0.4062
KENDALL'S TAU C	0.00427	0.4062
PEARSON'S R	0.01460	0.4065
GAMMA	0.09363	

NUMBER OF MISSING OBSERVATIONS = 0

R \ M (COUNT / ADJ RES)	1	2	3	4	5	6	7	ROW TOTAL
0	11	3	9	0	7	1	4	35
	1.2	-.2	-.3	-1.4	.4	-.8	-.1	13.2%
1	51	22	64	12	40	14	27	230
	-1.2	.2	.3	1.4	-.4	.8	.1	86.8%
COLUMN TOTAL	62	25	73	12	47	15	31	265
	23.4%	9.4%	27.5%	4.5%	17.7%	5.7%	11.7%	100.0%

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
3.69802	6	0.7175	1.585	4 OF 14 (28.6%)

STATISTIC	SYMMETRIC	WITH R DEPENDENT	WITH M DEPENDENT
LAMBDA	0.00881	0.	0.01042
UNCERTAINTY COEFFICIENT	0.00920	0.02555	0.00561
SOMERS' D	0.04039	0.02591	0.09155
ETA		0.11813	0.04852

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.11813	
CONTINGENCY COEFFICIENT	0.11731	
KENDALL'S TAU B	0.04871	0.1864
KENDALL'S TAU C	0.04198	0.1864
PEARSON'S R	0.04852	0.2158
GAMMA	0.11435	

NUMBER OF MISSING OBSERVATIONS = 0

R \ A (COUNT / ADJ RES)	0	1	ROW TOTAL
0	35 2.4	0 -2.4	35 13.2%
1	197 -2.4	33 2.4	230 86.8%
COLUMN TOTAL	232 87.5%	33 12.5%	265 100.0%

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
4.49547	1	0.0340	4.358	1 OF 4 (25.0%)
5.73604	1	0.0166	(BEFORE YATES CORRECTION)	

STATISTIC	SYMMETRIC	WITH R DEPENDENT	WITH A DEPENDENT
LAMBDA	0.	0.	0.
UNCERTAINTY COEFFICIENT	0.04943	0.04852	0.05038
SOMERS' D	0.14708	0.15086	0.14348
ETA		0.14712	0.14712

STATISTIC	VALUE	SIGNIFICANCE
PHI	0.14712	
CONTINGENCY COEFFICIENT	0.14556	
KENDALL'S TAU B	0.14712	0.0084
KENDALL'S TAU C	0.06579	0.0084
PEARSON'S R	0.14712	0.0083
GAMMA	1.00000	

NUMBER OF MISSING OBSERVATIONS = 0

APPENDIX H

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	29965.6391	4994.2732	.3157	.9285
WITHIN GROUPS	248	3923451.679	15820.3697		
TOTAL	254	3953417.318			

GROUP	COUNT	MEAN	STANDARD DEVIATION	STANDARD ERROR	MINIMUM	MAXIMUM	95 PCT CONF INT FOR MEAN
GRP 1	58	728.1724	138.0853	18.1315	309.0000	995.0000	691.8647 TO 764.480
GRP 2	24	737.8333	111.1414	22.6866	432.0000	854.0000	690.9024 TO 784.764
GRP 3	71	739.1408	121.0604	14.3672	348.0000	962.0000	710.4863 TO 767.795
GRP 4	12	764.8333	78.8483	22.7616	621.0000	866.0000	714.7355 TO 814.931
GRP 5	45	732.7556	136.4110	20.3350	336.0000	990.0000	691.7732 TO 773.738
GRP 6	15	724.6667	100.7229	26.0065	505.0000	854.0000	668.8882 TO 780.445
GRP 7	30	712.8333	130.9691	23.9116	341.0000	995.0000	663.9287 TO 761.738
TOTAL	255	732.6588	124.7583	7.8127	309.0000	995.0000	717.2730 TO 748.044
FIXED EFFECTS MODEL			125.7791	7.8766			717.1453 TO 748.172
RANDOM EFFECTS MODEL				7.8766			713.3856 TO 751.932

WARNING - BETWEEN COMPONENT VARIANCE IS NEGATIVE
IT WAS REPLACED BY 0.0 IN COMPUTING ABOVE RANDOM EFFECTS MEASURES

RANDOM EFFECTS MODEL - ESTIMATE OF BETWEEN COMPONENT VARIANCE -314.0081

APPENDIX I

- D I S C R I M I N A N T   A N A L Y S I S -

ON GROUPS DEFINED BY R

265 (UNWEIGHTED) CASES WERE PROCESSED.
0 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
265 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

	NUMBER OF CASES		
R	UNWEIGHTED	WEIGHTED	LABEL
0	35	35.0	
1	230	230.0	
TOTAL	265	265.0	

GROUP MEANS

R	SEX	A	FLY	SATE	GPA	M	GIS	AA
0	0.94286	0.	0.88571	1111.80000	288.22857	3.22857	8690.71429	64.14286
1	0.95217	0.14348	8.01304	1097.49130	278.90000	3.51304	8633.10435	64.00435
TOTAL	0.95094	0.12453	7.07170	1099.38113	280.13208	3.47547	8640.71321	64.02264

R	PL	NV	VB	OT
0	66.20000	65.45714	65.20000	60.45714
1	70.50435	70.19130	61.00870	65.23913
TOTAL	69.93585	69.56604	61.56226	64.60755

GROUP STANDARD DEVIATIONS

R	SEX	A	FLY	SATE	GPA	M	GIS	AA
0	0.23550	0.	1.89071	142.62081	45.06863	2.07348	1034.38270	17.47122
1	0.21386	0.35132	14.50899	140.67894	44.58429	1.97745	1068.43656	19.97892
TOTAL	0.21639	0.33081	13.74437	140.74804	44.67477	1.98869	1062.25803	19.63549

R	PL	NV	VB	OT
0	14.46456	14.75355	22.50595	19.15931
1	14.05005	15.61681	21.34884	19.81000
TOTAL	14.15310	15.56159	21.50821	19.75639

POOLED WITHIN-GROUPS COVARIANCE MATRIX WITH 263 DEGREES OF FREEDOM

	SEX	A	FLY	SATE	GPA	M	GIS	AA
SEX	0.4699478E-01							
A	-0.5405852E-02	0.1074723						
FLY	-0.2018445	-0.2563895	183.7586					
SATE	-6.049413	0.2463382	-91.54477	19861.68				
GPA	0.1458446	-0.1889734	-24.39842	1400.220	1993.372			
M	-0.1482654E-01	0.5729873E-01	-1.078421	-44.81131	-9.688322	3.960579		
GIS	-59.14230	6.161812	-239.2147	119417.3	23987.24	-306.3689	1132299.	
AA	-0.6945493	-0.1955695E-01	-7.819170	2221.473	166.6424	-5.451163	17129.44	387.0163
PL	-0.4982972	-0.1659448	30.62847	849.1955	30.73764	-2.791304	6241.209	133.7091
NV	-0.4219824	0.4436766	-0.1397161	1224.101	100.4629	-1.202399	9430.802	201.6902
VB	-0.8308150	-0.4421557	8.078988	2111.545	122.3407	-9.546107	15957.36	358.5551
OT	-0.5378528	0.4642916	-16.02239	1775.841	180.4481	0.4415417	14001.84	309.1729

	PL	NV	VB	OT
PL	198.9319			
NV	175.3179	240.4953		
VB	111.5346	113.9978	462.3330	
OT	120.5364	237.0348	156.1685	389.1579

POOLED WITHIN-GROUPS CORRELATION MATRIX

	SEX	A	FLY	SATE	GPA	M	GIS	AA	PL	NV	VB
SEX	1.00000										
A	-0.07607	1.00000									
FLY	-0.06869	-0.05769	1.00000								
SATE	-0.19801	0.00533	-0.04792	1.00000							
GPA	0.01507	-0.01291	-0.04031	0.22253	1.00000						
M	-0.03437	0.08782	-0.03997	-0.15977	-0.10904	1.00000					
GIS	-0.25639	0.01766	-0.01658	0.79630	0.50490	-0.14467	1.00000				
AA	-0.16286	-0.00303	-0.02932	0.80125	0.18973	-0.13923	0.81827	1.00000			
PL	-0.16297	-0.03589	0.16020	0.42722	0.04881	-0.09944	0.41585	0.48189	1.00000		
NV	-0.12552	0.08727	-0.00066	0.56009	0.14510	-0.03896	0.57150	0.66110	0.80153	1.00000	
VB	-0.17824	-0.06273	0.02772	0.69681	0.12744	-0.22308	0.69743	0.84764	0.36777	0.34187	1.00000
QT	-0.12577	0.07179	-0.05992	0.63875	0.20488	0.01125	0.66702	0.79666	0.43321	0.77481	0.36817

	QT
QT	1.00000

CORRELATIONS WHICH CANNOT BE COMPUTED ARE PRINTED AS 99.0.

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 263 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
SEX	0.99979	0.5611E-01	0.8129
A	0.97835	5.819	0.0165
FLY	0.96906	8.398	0.0041
SATE	0.99881	0.3131	0.5762
GPA	0.99498	1.326	0.2505
M	0.99765	0.6207	0.4315
GIS	0.99966	0.8904E-01	0.7656
AA	0.99999	0.1506E-02	0.9691
PL	0.98936	2.829	0.0938
NV	0.98935	2.831	0.0937
VB	0.99563	1.154	0.2836
QT	0.99326	1.785	0.1827

COVARIANCE MATRIX FOR GROUP 0.

	SEX	A	FLY	SATE	GPA	M	GIS	AA
SEX	0.5546218E-01							
A	0.	0.						
FLY	0.5210084E-01	0.	3.574790					
SATE	-5.511765	0.	-39.34706	20340.69				
GPA	2.719328	0.	4.291597	288.4882	2031.182			
M	-0.4537815E-01	0.	0.8571429E-01	15.37059	-26.75966	4.299160		
GIS	-54.69328	0.	-175.6807	107018.1	24006.86	-397.4034	1069948.	
AA	-1.050420	0.	-6.542017	2110.088	138.6429	-1.768908	15152.84	305.2437
PL	-1.664706	0.	-6.300000	775.2176	-71.84118	2.011765	4625.735	110.5294
NV	-1.355462	0.	-5.740336	818.4471	-87.31345	4.951261	4845.252	135.6681
VB	-1.076471	0.	-6.329412	2270.512	145.2471	-9.400000	16513.97	316.2941
QT	-0.7672269	0.	-5.005042	1454.771	98.27479	8.598319	10038.34	219.9328

	PL	NV	VB	QT
PL	209.2235			
NV	169.6118	217.6672		
VB	91.75294	37.52353	506.5176	
QT	105.2000	205.6672	38.02353	367.0790

COVARIANCE MATRIX FOR GROUP 1.

	SEX	A	FLY	SATE	GPA	M	GIS	AA
SEX	0.4573761E-01							
A	-0.6208468E-02	0.1234289						
FLY	-0.2395481	-0.2944560	210.5107					
SATE	-6.129239	0.2829125	-99.29465	19790.57				
GPA	-0.2362445	-0.2170306	-28.65808	1565.281	1987.759			
M	-0.1029049E-01	0.6580596E-01	-1.251263	-53.74661	-7.153712	3.910309		
GIS	-59.80285	7.076666	-248.6477	121258.2	23984.32	-292.8529	1141557.	
AA	-0.6417125	-0.2246060E-01	-8.008791	2238.011	170.7996	-5.997874	17422.91	399.1572
PL	-0.3251187	-0.1905829	36.11130	860.1791	45.96769	-3.504424	6481.061	137.1506
NV	-0.2833871	0.5095500	0.6918170	1284.329	128.3424	-2.116043	10111.63	211.4926
VB	-0.7943421	-0.5078033	10.21823	2087.943	118.9397	-9.567800	15874.72	364.8297
QT	-0.5037972	0.5332257	-17.65815	1823.511	192.6485	-0.7695083	14590.31	322.4225

	PL	NV	VB	QT
PL	197.4039			
NV	176.1651	243.8846		
VB	114.4716	125.3520	455.7728	
QT	122.8134	241.6920	173.7097	392.4360

TOTAL COVARIANCE MATRIX WITH 264 DEGREES OF FREEDOM

	SEX	A	FLY	SATE	GPA	M	GIS	AA
SEX	0.4682676E-01							
A	-0.5231561E-02	0.1094340						
FLY	-0.1934391	-0.1377501	188.9077					
SATE	-6.041838	0.9176672E-02	-102.9327	19810.01				
GPA	0.1352916	-0.3422670	-31.95648	1410.275	1995.835			
M	-0.1446541E-01	0.6177816E-01	-0.8410377	-45.10993	-9.956975	3.954889		
GIS	-58.98003	5.187364	-285.5551	119059.8	23958.22	-307.0942	1128392.	
AA	-0.6920669	-0.2176958E-01	-7.903145	2213.287	166.1599	-5.435049	17065.47	385.5525
PL	-0.4917953	-0.9425386E-01	34.04250	838.8920	26.00093	-2.639837	6189.035	133.1340
NV	-0.4153087	0.5201544	3.743353	1211.670	95.00071	-1.042882	9363.697	200.8508
VB	-0.8321612	-0.5096770	4.611049	2110.448	126.3762	-9.647141	15924.70	357.2637
QT	-0.5306890	0.5414808	-12.03994	1761.241	174.6316	0.5963979	13917.11	307.9256

	PL	NV	VB	QT
PL	200.3103			
NV	176.9986	242.1632		
VB	109.0362	111.2828	462.6031	
QT	122.4482	238.7419	153.2707	390.3151

- D I S C R I M I N A N T   A N A L Y S I S - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R

ANALYSIS NUMBER 1

DIRECT METHOD: ALL VARIABLES PASSING THE TOLERANCE TEST ARE ENTERED.
MINIMUM TOLERANCE LEVEL.................. 0.00100

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS.............. 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.50000

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.9147457	22.901	12	0.0286
1*	0.09320	100.00	100.00	0.2919834	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
SEX	0.22072
A	0.48990
FLY	0.55322
SATE	-0.35183
GPA	-0.33329
M	0.04560
GIS	0.28951
AA	-1.91118
PL	0.38241
NV	-0.11064
VB	0.89566
QT	1.50784

STRUCTURE MATRIX:

POOLED WITHIN-GROUPS CORRELATIONS BETWEEN DISCRIMINATING VARIABLES
AND CANONICAL DISCRIMINANT FUNCTIONS
(VARIABLES ORDERED BY SIZE OF CORRELATION WITHIN FUNCTION)

	FUNC 1
FLY	0.63213
A	0.52619
NV	0.36702
PL	0.33095
GPA	-0.25120
VB	-0.23436
QT	0.18809
M	0.10412
GIS	-0.09754
SEX	-0.08395
SATE	-0.06113
AA	-0.05001

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
A	1.516025
FLY	0.4877497E-01
GPA	-0.5434677E-02
NV	0.3099251E-01
VB	-0.1650553E-01
(CONSTANT)	-0.1511912

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
0	-0.72190
1	0.10985

TEST OF EQUALITY OF GROUP COVARIANCE MATRICES USING BOX'S M

THE RANKS AND NATURAL LOGARITHMS OF DETERMINANTS PRINTED ARE THOSE OF THE GROUP COVARIANCE MATRICES.

GROUP LABEL	RANK	LOG DETERMINANT
0	11	(SINGULAR)
1	12	51.236345
POOLED WITHIN-GROUPS COVARIANCE MATRIX	12	51.040543

NO TEST CAN BE PERFORMED WITHOUT AT LEAST TWO NON-SINGULAR GROUP COVARIANCE MATRICES.

- D I S C R I M I N A N T   A N A L Y S I S - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R

ANALYSIS NUMBER 2

STEPWISE VARIABLE SELECTION
SELECTION RULE: MINIMIZE WILKS' LAMBDA
MAXIMUM NUMBER OF STEPS.................... 24
MINIMUM TOLERANCE LEVEL.................... 0.00100
MINIMUM F TO ENTER......................... 1.0000
MAXIMUM F TO REMOVE........................ 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS................ 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE..... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA...... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.50000

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
SEX	1.0000000	1.0000000	0.56109E-01	0.99979
A	1.0000000	1.0000000	5.8187	0.97835
FLY	1.0000000	1.0000000	8.3976	0.96906
SATE	1.0000000	1.0000000	0.31314	0.99881
GPA	1.0000000	1.0000000	1.3261	0.99498
M	1.0000000	1.0000000	0.62068	0.99765
GIS	1.0000000	1.0000000	0.89040E-01	0.99966
AA	1.0000000	1.0000000	0.15058E-02	0.99999
PL	1.0000000	1.0000000	2.8292	0.98936
NV	1.0000000	1.0000000	2.8309	0.98935
VB	1.0000000	1.0000000	1.1542	0.99563
QT	1.0000000	1.0000000	1.7850	0.99326

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP   1. FLY      WAS INCLUDED IN THE ANALYSIS.

                                         DEGREES OF FREEDOM  SIGNIF.   BETWEEN GROUPS
WILKS' LAMBDA          0.96906          1     1       263.0
EQUIVALENT F           8.39762                1       263.0  0.0041

---------------- VARIABLES IN THE ANALYSIS AFTER STEP   1 ----------------

VARIABLE  TOLERANCE  F TO REMOVE   WILKS' LAMBDA
FLY       1.0000000    8.3976

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP   1 ----------------

                     MINIMUM
VARIABLE  TOLERANCE  TOLERANCE  F TO ENTER    WILKS' LAMBDA
SEX       0.9952822  0.9952822  0.18431           0.96838
A         0.9966714  0.9966714   6.4443           0.94579
SATE      0.9977038  0.9977038  0.17127           0.96842
GPA       0.9983749  0.9983749   1.0353           0.96524
M         0.9984020  0.9984020  0.78962           0.96615
GIS       0.9997250  0.9997250  0.60516E-01       0.96883
AA        0.9991403  0.9991403  0.20589E-02       0.96905
PL        0.9743375  0.9743375   1.4694           0.96365
NV        0.9999996  0.9999996   2.7392           0.95903
VB        0.9992317  0.9992317   1.2881           0.96432
QT        0.9964101  0.9964101   2.2081           0.96096

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP   1
EACH F STATISTIC HAS   1 AND      263.0 DEGREES OF FREEDOM.

                GROUP        0

   GROUP

     1                  8.3976
                        0.0041
```

* *

AT STEP 2, A WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.94579	2	1	263.0		
EQUIVALENT F	7.50788		2	262.0	0.0007	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
A	0.9966714	6.4443	0.96906
FLY	0.9966714	9.0196	0.97835

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
SEX	0.9888562	0.9888562	0.39247	0.94437
SATE	0.9976972	0.9944046	0.17183	0.94517
GPA	0.9981419	0.9949854	0.93159	0.94243
M	0.9910642	0.9893463	0.44096	0.94420
CIS	0.9994449	0.9963922	0.80940E-01	0.94550
AA	0.9991179	0.9958014	0.32026E-02	0.94578
PL	0.9736251	0.9716358	1.5962	0.94005
NV	0.9923648	0.9890621	2.0126	0.93856
VB	0.9954827	0.9929320	0.93623	0.94241
QT	0.9917247	0.9917247	1.6812	0.93974

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 2
EACH F STATISTIC HAS 2 AND 262.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	7.5079 0.0007

* *

AT STEP 3. NV WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.93856	3	1	263.0		
EQUIVALENT F	5.69545		3	261.0	0.0009	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
A	0.9890621	5.6935	0.95903
FLY	0.9966522	8.8750	0.97047
NV	0.9923648	2.0126	0.94579

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
SEX	0.9746911	0.9746911	0.63589	0.93627
SATE	0.6818751	0.6782306	2.1271	0.93094
GPA	0.9765430	0.9708908	1.3923	0.93356
M	0.9888880	0.9811307	0.52872	0.93665
GIS	0.6720167	0.6672561	1.7676	0.93222
AA	0.5581775	0.5544048	1.3886	0.93357
PL	0.3222835	0.3222835	0.31725E-01	0.93844
VB	0.8739779	0.8712405	2.4107	0.92994
QT	0.3961384	0.3961384	0.96282E-01	0.93821

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 3
EACH F STATISTIC HAS 3 AND 261.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	5.6954 0.0009

* *

AT STEP 4, VB WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.92994	4	1	263.0		
EQUIVALENT F	4.89735		4	260.0	0.0008	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 4 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
A	0.9796869	4.8568	0.94731
FLY	0.9960697	8.9857	0.96207
NV	0.8712405	3.4890	0.94241
VB	0.8739779	2.4107	0.93856

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 4 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
SEX	0.9523428	0.8539388	0.31942	0.92879
SATE	0.3930695	0.3930695	0.34363	0.92870
GPA	0.9698657	0.8606669	1.0990	0.92601
M	0.9429046	0.8333378	0.15932	0.92936
GIS	0.3865874	0.3865874	0.17309	0.92931
AA	0.1230164	0.1230164	0.16604	0.92934
PL	0.3148913	0.3148913	0.17252	0.92932
QT	0.3835200	0.3835200	0.35176	0.92867

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 4
EACH F STATISTIC HAS 4 AND 260.0 DEGREES OF FREEDOM.

GROUP	0
GROUP	
1	4.8974 0.0008

* *

AT STEP 5, GPA WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.92601	5	1	263.0		
EQUIVALENT F	4.13917		5	259.0	0.0012	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 5 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
A	0.9792848	4.7202	0.94288
FLY	0.9941092	8.6053	0.95677
GPA	0.9698657	1.0990	0.92994
NV	0.8606669	3.8671	0.93983
VB	0.8680020	2.1123	0.93356

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 5 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
SEX	0.9506278	0.8472991	0.36935	0.92468
SATE	0.3839329	0.3839329	0.18462	0.92534
M	0.9354616	0.8301356	0.93626E-01	0.92567
GIS	0.2402486	0.2402486	0.83655E-01	0.92571
AA	0.1216066	0.1216066	0.27102	0.92503
PL	0.3097268	0.3097268	0.79690E-01	0.92572
QT	0.3767704	0.3767704	0.54127	0.92407

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 5
EACH F STATISTIC HAS 5 AND 259.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	4.1392 0.0012

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	FLY		1	.96906	.0041	
2	A		2	.94579	.0007	
3	NV		3	.93856	.0009	
4	VB		4	.92994	.0008	
5	GPA		5	.92601	.0012	

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.9260060	20.026	5	0.0012
1*	0.07991	100.00	100.00	0.2720185	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
A	0.49700
FLY	0.66118
GPA	-0.24264
NV	0.48063
VB	-0.35490

STRUCTURE MATRIX:

POOLED WITHIN-GROUPS CORRELATIONS BETWEEN DISCRIMINATING VARIABLES
AND CANONICAL DISCRIMINANT FUNCTIONS
(VARIABLES ORDERED BY SIZE OF CORRELATION WITHIN FUNCTION)

	FUNC 1
FLY	0.63213
A	0.52619
NV	0.36702
PL	0.33095
GPA	-0.25120
VB	-0.23436
QT	0.18809
M	0.10412
GIS	-0.09754
SEX	-0.08395
SATE	-0.06113
AA	-0.05001

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
A	1.516025
FLY	0.4877497E-01
GPA	-0.5434677E-02
NV	0.3099251E-01
VB	-0.1650553E-01
(CONSTANT)	-0.1511912

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
0	-0.72190
1	0.10985

TEST OF EQUALITY OF GROUP COVARIANCE MATRICES USING BOX'S M

THE RANKS AND NATURAL LOGARITHMS OF DETERMINANTS PRINTED ARE THOSE OF THE GROUP COVARIANCE MATRICES.

GROUP LABEL	RANK	LOG DETERMINANT
0	4	(SINGULAR)
1	5	22.251803
POOLED WITHIN-GROUPS COVARIANCE MATRIX	5	22.023373

NO TEST CAN BE PERFORMED WITHOUT AT LEAST TWO NON-SINGULAR GROUP COVARIANCE MATRICES.

ON GROUPS DEFINED BY R

ANALYSIS NUMBER 3

STEPWISE VARIABLE SELECTION

SELECTION RULE: MAXIMIZE MINIMUM MAHALANOBIS DISTANCE (D SQUARED) BETWEEN GROUPS

MAXIMUM NUMBER OF STEPS.................... 24
MINIMUM TOLERANCE LEVEL.................... 0.00100
MINIMUM F TO ENTER........................ 1.0000
MAXIMUM F TO REMOVE....................... 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS............... 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.50000

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	D SQUARED	BETWEEN GROUPS	
SEX	1.0000000	1.0000000	0.56109E-01			
A	1.0000000	1.0000000	5.8187	0.1915471	0	1
FLY	1.0000000	1.0000000	8.3976	0.2764433	0	1
SATE	1.0000000	1.0000000	0.31314			
GPA	1.0000000	1.0000000	1.3261	0.4365579E-01	0	1
M	1.0000000	1.0000000	0.62068			
GIS	1.0000000	1.0000000	0.89040E-01			
AA	1.0000000	1.0000000	0.15058E-02			
PL	1.0000000	1.0000000	2.8292	0.9313442E-01	0	1
NV	1.0000000	1.0000000	2.8309	0.9319219E-01	0	1
VB	1.0000000	1.0000000	1.1542	0.3799649E-01	0	1
QT	1.0000000	1.0000000	1.7850	0.5876125E-01	0	1

* *

AT STEP 1, FLY WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS	
WILKS' LAMBDA	0.96906	1	1	263.0			
EQUIVALENT F	8.39762		1	263.0	0.0041		
MINIMUM D SQUARED	0.276443					0	1
EQUIVALENT F	8.39762		1	263.0	0.0041		

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	D SQUARED	BETWEEN GROUPS
FLY	1.0000000	8.3976		

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	D SQUARED	BETWEEN GROUPS	
SEX	0.9952822	0.9952822	0.18431			
A	0.9966714	0.9966714	6.4443	0.4961941	0	1
SATE	0.9977038	0.9977038	0.17127			
GPA	0.9983749	0.9983749	1.0353	0.3117485	0	1
M	0.9984020	0.9984020	0.78962			
GIS	0.9997250	0.9997250	0.60516E-01			
AA	0.9991403	0.9991403	0.20589E-02			
PL	0.9743375	0.9743375	1.4694	0.3265490	0	1
NV	0.9999996	0.9999996	2.7392	0.3698490	0	1
VB	0.9992317	0.9992317	1.2881	0.3203674	0	1
QT	0.9964101	0.9964101	2.2081	0.3517401	0	1

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 1
EACH F STATISTIC HAS 1 AND 263.0 DEGREES OF FREEDOM.

GROUP	0
GROUP	
1	8.3976 0.0041

* *

AT STEP 2, A WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS	
WILKS' LAMBDA	0.94579	2	1	263.0			
EQUIVALENT F	7.50788		2	262.0	0.0007		
MINIMUM D SQUARED	0.496194					0	1
EQUIVALENT F	7.50788		2	262.0	0.0007		

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	D SQUARED	BETWEEN GROUPS
A	0.9966714	6.4443		
FLY	0.9966714	9.0196		

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	D SQUARED	BETWEEN GROUPS	
SEX	0.9888562	0.9888562	0.39247			
SATE	0.9976972	0.9944046	0.17183			
GPA	0.9981419	0.9949854	0.93159			
M	0.9910642	0.9893463	0.44096			
GIS	0.9994449	0.9963922	0.80940E-01			
AA	0.9991179	0.9958014	0.32026E-02			
PL	0.9736251	0.9716358	1.5962	0.5521763	0	1
NV	0.9923648	0.9890621	2.0126	0.5667796	0	1
VB	0.9954827	0.9929320	0.93623			
QT	0.9917247	0.9917247	1.6812	0.5551599	0	1

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 2
EACH F STATISTIC HAS 2 AND 262.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	7.5079 0.0007

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP   3. NV       WAS INCLUDED IN THE ANALYSIS.

                                         DEGREES OF FREEDOM  SIGNIF.   BETWEEN GROUPS
WILKS' LAMBDA        0.93856              3    1      263.0
EQUIVALENT F         5.69545                   3      261.0  0.0009

MINIMUM D SQUARED   0.566780                                               0        1
EQUIVALENT F         5.69545                   3      261.0  0.0009

---------------- VARIABLES IN THE ANALYSIS AFTER STEP   3 ----------------

VARIABLE  TOLERANCE  F TO REMOVE     D SQUARED        BETWEEN GROUPS
A         0.9890621    5.6935
FLY       0.9966522    8.8750
NV        0.9923648    2.0126

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP   3 ----------------

                     MINIMUM
VARIABLE  TOLERANCE  TOLERANCE  F TO ENTER      D SQUARED         BETWEEN GROUPS
SEX       0.9746911  0.9746911  0.63589
SATE      0.6818751  0.6782306   2.1271         0.6422474            0        1
GPA       0.9765430  0.9708908   1.3923         0.6161780            0        1
M         0.9888880  0.9811307  0.52872
GIS       0.6720167  0.6672561   1.7676         0.6294926            0        1
AA        0.5581775  0.5544048   1.3886         0.6160441            0        1
PL        0.3272835  0.3222835  0.31725E-01
VB        0.8739779  0.8712405   2.4107         0.6523095            0        1
QT        0.3961384  0.3961384  0.96282E-01


F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP   3
EACH F STATISTIC HAS   3 AND      261.0 DEGREES OF FREEDOM.

                GROUP        0

   GROUP

      1                 5.6954
                        0.0009
```

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP   4. VB       WAS INCLUDED IN THE ANALYSIS.

                                   DEGREES OF FREEDOM  SIGNIF.   BETWEEN GROUPS
WILKS' LAMBDA        0.92994        4     1     263.0
EQUIVALENT F         4.89735              4     260.0  0.0008

MINIMUM D SQUARED   0.652309                                         0        1
EQUIVALENT F         4.89735              4     260.0  0.0008

--------------- VARIABLES IN THE ANALYSIS AFTER STEP   4 ---------------

VARIABLE  TOLERANCE  F TO REMOVE     D SQUARED        BETWEEN GROUPS
A         0.9796869    4.8568
FLY       0.9960697    8.9857
NV        0.8712405    3.4890
VB        0.8739779    2.4107

--------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP   4 ---------------

                     MINIMUM
VARIABLE  TOLERANCE  TOLERANCE  F TO ENTER      D SQUARED        BETWEEN GROUPS
SEX       0.9523428  0.8539388   0.31942
SATE      0.3930695  0.3930695   0.34363
GPA       0.9698657  0.8606669    1.0990      0.6918131          0        1
M         0.9429046  0.8333378   0.15932
GIS       0.3865874  0.3865874   0.17309
AA        0.1230164  0.1230164   0.16604
PL        0.3148913  0.3148913   0.17252
QT        0.3835200  0.3835200   0.35176


F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP   4
EACH F STATISTIC HAS   4 AND      260.0 DEGREES OF FREEDOM.

                 GROUP        0

   GROUP

      1                    4.8974
                           0.0008
```

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP   5, GPA      WAS INCLUDED IN THE ANALYSIS.

                                      DEGREES OF FREEDOM  SIGNIF.   BETWEEN GROUPS
WILKS' LAMBDA        0.92601           5    1      263.0
EQUIVALENT F         4.13917                5      259.0  0.0012

MINIMUM D SQUARED   0.691813                                          0         1
EQUIVALENT F         4.13917                5      259.0  0.0012

---------------- VARIABLES IN THE ANALYSIS AFTER STEP   5 ----------------

VARIABLE  TOLERANCE  F TO REMOVE     D SQUARED        BETWEEN GROUPS
A         0.9792848   4.7202
FLY       0.9941092   8.6053
GPA       0.9698657   1.0990
NV        0.8606669   3.8671
VB        0.8680020   2.1123

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP   5 ----------------

                      MINIMUM
VARIABLE  TOLERANCE  TOLERANCE  F TO ENTER      D SQUARED        BETWEEN GROUPS
SEX       0.9506278  0.8472991  0.36935
SATE      0.3839329  0.3839329  0.18462
M         0.9354616  0.8301356  0.93626E-01
GIS       0.2402486  0.2402486  0.83655E-01
AA        0.1216066  0.1216066  0.27102
PL        0.3097268  0.3097268  0.79690E-01
OT        0.3767704  0.3767704  0.54127

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP   5
EACH F STATISTIC HAS   5 AND      259.0 DEGREES OF FREEDOM.

                  GROUP        0

   GROUP

       1                    4.1392
                            0.0012

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.
```

SUMMARY TABLE

STEP	ACTION ENTERED REMOVED	VARS IN	WILKS' LAMBDA	SIG.	MINIMUM D SQUARED	SIG.	BETWEEN GROUPS	LABEL
1	FLY	1	.96906	.0041	.27644	.0041	0 1	
2	A	2	.94579	.0007	.49619	.0007	0 1	
3	NV	3	.93856	.0009	.56678	.0009	0 1	
4	VB	4	.92994	.0008	.65231	.0008	0 1	
5	GPA	5	.92601	.0012	.69181	.0012	0 1	

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.9260060	20.026	5	0.0012
1*	0.07991	100.00	100.00	0.2720185	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
A	0.49700
FLY	0.66118
GPA	-0.24264
NV	0.48063
VB	-0.35490

STRUCTURE MATRIX:

POOLED WITHIN-GROUPS CORRELATIONS BETWEEN DISCRIMINATING VARIABLES
AND CANONICAL DISCRIMINANT FUNCTIONS
(VARIABLES ORDERED BY SIZE OF CORRELATION WITHIN FUNCTION)

	FUNC 1
FLY	0.58532
A	0.48722
NV	0.33984
PL	0.33974
QT	0.26986
GPA	-0.23260
VB	-0.21700
M	0.15913
SATE	-0.11303
GIS	-0.06027
SEX	0.04784
AA	-0.00784

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
SEX	1.018171
A	1.494363
FLY	0.4081059E-01
SATE	-0.2496478E-02
GPA	-0.7464887E-02
M	0.2291415E-01
GIS	0.2720748E-03
AA	-0.9714881E-01
PL	0.2711331E-01
NV	-0.7134113E-02
VB	0.4165497E-01
QT	0.7643523E-01
(CONSTANT)	-1.720581

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
0	-0.77964
1	0.11864

TEST OF EQUALITY OF GROUP COVARIANCE MATRICES USING BOX'S M

THE RANKS AND NATURAL LOGARITHMS OF DETERMINANTS PRINTED ARE THOSE OF THE GROUP COVARIANCE MATRICES.

GROUP LABEL	RANK	LOG DETERMINANT
0	4	(SINGULAR)
1	5	22.251803
POOLED WITHIN-GROUPS COVARIANCE MATRIX	5	22.023373

NO TEST CAN BE PERFORMED WITHOUT AT LEAST TWO NON-SINGULAR GROUP COVARIANCE MATRICES.

- D I S C R I M I N A N T   A N A L Y S I S - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R

ANALYSIS NUMBER 4

STEPWISE VARIABLE SELECTION

SELECTION RULE: MINIMIZE SUM OF UNEXPLAINED VARIATIONS (RESIDUAL VARIANCE)

MAXIMUM NUMBER OF STEPS.................... 24
MINIMUM TOLERANCE LEVEL.................... 0.00100
MINIMUM F TO ENTER......................... 1.0000
MAXIMUM F TO REMOVE........................ 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS................ 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.50000

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	RESIDUAL VARIANCE
SEX	1.0000000	1.0000000	0.56109E-01	
A	1.0000000	1.0000000	5.8187	0.95430
FLY	1.0000000	1.0000000	8.3976	0.93536
SATE	1.0000000	1.0000000	0.31314	
GPA	1.0000000	1.0000000	1.3261	0.98920
M	1.0000000	1.0000000	0.62068	
GIS	1.0000000	1.0000000	0.89040E-01	
AA	1.0000000	1.0000000	0.15058E-02	
PL	1.0000000	1.0000000	2.8292	0.97725
NV	1.0000000	1.0000000	2.8309	0.97723
VB	1.0000000	1.0000000	1.1542	0.99059
QT	1.0000000	1.0000000	1.7850	0.98552

* *

AT STEP 1, FLY WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.96906	1	1	263.0		
EQUIVALENT F	8.39762		1	263.0	0.0041	

RESIDUAL VARIANCE 0.93536

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	RESIDUAL VARIANCE
FLY	1.0000000	8.3976	

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	RESIDUAL VARIANCE
SEX	0.9952822	0.9952822	0.18431	
A	0.9966714	0.9966714	6.4443	0.88964
SATE	0.9977038	0.9977038	0.17127	
GPA	0.9983749	0.9983749	1.0353	0.92770
M	0.9984020	0.9984020	0.78962	
GIS	0.9997250	0.9997250	0.60516E-01	
AA	0.9991403	0.9991403	0.20589E-02	
PL	0.9743375	0.9743375	1.4694	0.92452
NV	0.9999996	0.9999996	2.7392	0.91536
VB	0.9992317	0.9992317	1.2881	0.92585
QT	0.9964101	0.9964101	2.2081	0.91917

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 1
EACH F STATISTIC HAS 1 AND 263.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	8.3976 0.0041

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP   2, A          WAS INCLUDED IN THE ANALYSIS.

                                      DEGREES OF FREEDOM  SIGNIF.   BETWEEN GROUPS
WILKS' LAMBDA        0.94579          2     1      263.0
EQUIVALENT F         7.50788                2      262.0  0.0007

RESIDUAL VARIANCE    0.88964

---------------- VARIABLES IN THE ANALYSIS AFTER STEP   2 ----------------

VARIABLE  TOLERANCE  F TO REMOVE  RESIDUAL VARIANCE
A         0.9966714    6.4443
FLY       0.9966714    9.0196

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP   2 ----------------

                      MINIMUM
VARIABLE  TOLERANCE  TOLERANCE   F TO ENTER    RESIDUAL VARIANCE
SEX       0.9888562  0.9888562   0.39247
SATE      0.9976972  0.9944046   0.17183
GPA       0.9981419  0.9949854   0.93159
M         0.9910642  0.9893463   0.44096
GIS       0.9994449  0.9963922   0.80940E-01
AA        0.9991179  0.9958014   0.32026E-02
PL        0.9736251  0.9716358    1.5962          0.87870
NV        0.9923648  0.9890621    2.0126          0.87589
VB        0.9954827  0.9929320   0.93623
OT        0.9917247  0.9917247    1.6812          0.87813


F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP   2
EACH F STATISTIC HAS   2 AND      262.0 DEGREES OF FREEDOM.

                GROUP        0

   GROUP

       1                7.5079
                        0.0007
```

* *

AT STEP 3, NV WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.93856	3	1	263.0		
EQUIVALENT F	5.69545		3	261.0	0.0009	

RESIDUAL VARIANCE 0.87589

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	RESIDUAL VARIANCE
A	0.9890621	5.6935	
FLY	0.9966522	8.8750	
NV	0.9923648	2.0126	

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	RESIDUAL VARIANCE
SEX	0.9746911	0.9746911	0.63589	
SATE	0.6818751	0.6782306	2.1271	0.86165
GPA	0.9765430	0.9708908	1.3923	0.86652
M	0.9888880	0.9811307	0.52872	
GIS	0.6720167	0.6672561	1.7676	0.86403
AA	0.5581775	0.5544048	1.3886	0.86654
PL	0.3222835	0.3222835	0.31725E-01	
VB	0.8739779	0.8712405	2.4107	0.85979
QT	0.3961384	0.3961384	0.96282E-01	

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 3
EACH F STATISTIC HAS 3 AND 261.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	5.6954 0.0009

* *

AT STEP 4, VB WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIF.	BETWEEN GROUPS
WILKS' LAMBDA	0.92994	4	1	263.0		
EQUIVALENT F	4.89735		4	260.0	0.0008	

RESIDUAL VARIANCE 0.85979

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 4 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	RESIDUAL VARIANCE
A	0.9796869	4.8568	
FLY	0.9960697	8.9857	
NV	0.8712405	3.4890	
VB	0.8739779	2.4107	

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 4 ----------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	RESIDUAL VARIANCE
SEX	0.9523428	0.8539388	0.31942	
SATE	0.3930695	0.3930695	0.34363	
GPA	0.9698657	0.8606669	1.0990	0.85255
M	0.9429046	0.8333378	0.15932	
GIS	0.3865874	0.3865874	0.17309	
AA	0.1230164	0.1230164	0.16604	
PL	0.3148913	0.3148913	0.17252	
QT	0.3835200	0.3835200	0.35176	

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 4
EACH F STATISTIC HAS 4 AND 260.0 DEGREES OF FREEDOM.

GROUP	GROUP 0
1	4.8974 0.0008

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP    5, GPA       WAS INCLUDED IN THE ANALYSIS.

                                          DEGREES OF FREEDOM  SIGNIF.   BETWEEN GROUPS
WILKS' LAMBDA        0.92601         5     1        263.0
EQUIVALENT F         4.13917               5        259.0  0.0012

RESIDUAL VARIANCE    0.85255

---------------- VARIABLES IN THE ANALYSIS AFTER STEP    5 ----------------

VARIABLE  TOLERANCE  F TO REMOVE  RESIDUAL VARIANCE
A         0.9792848    4.7202
FLY       0.9941092    8.6053
GPA       0.9698657    1.0990
NV        0.8606669    3.8671
VB        0.8680020    2.1123

---------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP    5 ----------------

                     MINIMUM
VARIABLE  TOLERANCE  TOLERANCE  F TO ENTER    RESIDUAL VARIANCE
SEX       0.9506278  0.8472991   0.36935
SATE      0.3839329  0.3839329   0.18462
M         0.9354616  0.8301356   0.93626E-01
GIS       0.2402486  0.2402486   0.83655E-01
AA        0.1216066  0.1216066   0.27102
PL        0.3097268  0.3097268   0.79690E-01
QT        0.3767704  0.3767704   0.54127


F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP    5
EACH F STATISTIC HAS    5 AND       259.0 DEGREES OF FREEDOM.

                 GROUP         0

   GROUP

       1                 4.1392
                         0.0012

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.
```

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	RESIDUAL VARIANCE	LABEL
1	FLY		1	.96906	.0041	.93536	
2	A		2	.94579	.0007	.88964	
3	NV		3	.93856	.0009	.87589	
4	VB		4	.92994	.0008	.85979	
5	GPA		5	.92601	.0012	.85255	

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.9260060	20.026	5	0.0012
1*	0.07991	100.00	100.00	0.2720185	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
A	0.49700
FLY	0.66118
GPA	-0.24264
NV	0.48063
VB	-0.35490

STRUCTURE MATRIX:

POOLED WITHIN-GROUPS CORRELATIONS BETWEEN DISCRIMINATING VARIABLES
AND CANONICAL DISCRIMINANT FUNCTIONS
(VARIABLES ORDERED BY SIZE OF CORRELATION WITHIN FUNCTION)

	FUNC 1
FLY	0.63213
A	0.52619
NV	0.36702
PL	0.33095
GPA	-0.25120
VB	-0.23436
QT	0.18809
M	0.10412
GIS	-0.09754
SEX	-0.08395
SATE	-0.06113
AA	-0.05001

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
A	1.516025
FLY	0.4877497E-01
GPA	-0.5434677E-02
NV	0.3099251E-01
VB	-0.1650553E-01
(CONSTANT)	-0.1511912

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
0	-0.72190
1	0.10985

TEST OF EQUALITY OF GROUP COVARIANCE MATRICES USING BOX'S M

THE RANKS AND NATURAL LOGARITHMS OF DETERMINANTS PRINTED ARE THOSE OF THE GROUP COVARIANCE MATRICES.

GROUP LABEL	RANK	LOG DETERMINANT
0	4	(SINGULAR)
1	5	22.251803
POOLED WITHIN-GROUPS COVARIANCE MATRIX	5	22.023373

NO TEST CAN BE PERFORMED WITHOUT AT LEAST TWO NON-SINGULAR GROUP COVARIANCE MATRICES.

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- - - - - - - - - - - - - - - - - - - - -  D I S C R I M I N A N T   A N A L Y S I S  - - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R


ANALYSIS NUMBER..    1

NUMBER OF CANONICAL DISCRIMINANT FUNCTIONS..    1

LIST OF THE  12 VARIABLES USED..

VARIABLE  LABEL
--------  ----------------------------------------
SEX
A
FLY
SATE
GPA
M
GIS
AA
PL
NV
VB
QT
```

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
1			1	**	0	0.1690	0.8374	1	0.1626	-2.1549
2			1	**	0	0.9813	0.5944	1	0.4056	-0.7562
3			1		1	0.6851	0.5098	0	0.4902	-0.2869
4			1	**	0	0.7512	0.5296	1	0.4704	-0.4626
5			0		0	0.9313	0.6180	1	0.3820	-0.8659
6			0	**	1	0.9017	0.5726	0	0.4274	-0.0048
7			0		0	0.7705	0.6605	1	0.3395	-1.0713
8			1	**	0	0.8298	0.6449	1	0.3551	-0.9946
9			1		1	0.4420	0.7491	0	0.2509	0.8874
10			1	**	0	0.7844	0.5393	1	0.4607	-0.5061
11			1	**	0	0.9857	0.5956	1	0.4044	-0.7617
12			0		0	0.6630	0.5030	1	0.4970	-0.3438
13			1	**	0	0.4632	0.7431	1	0.2569	-1.5132
14			1	**	0	0.9477	0.6136	1	0.3864	-0.8452
15			1		1	0.9309	0.5807	0	0.4193	0.0319
16			0		0	0.7942	0.6543	1	0.3457	-1.0405
17			1	**	0	0.7434	0.6676	1	0.3324	-1.1071
18			1	**	0	0.9084	0.5745	1	0.4255	-0.6646
19			1		1	0.8242	0.5508	0	0.4492	-0.1035
20			1		1	0.7744	0.5364	0	0.4636	-0.1680
21			1		1	0.8232	0.6466	0	0.3534	0.3421
22			1		1	0.5256	0.7258	0	0.2742	0.7534
23			1	**	0	0.5970	0.7065	1	0.2935	-1.3084
24			1		1	0.9569	0.5878	0	0.4122	0.0646
25			1	**	0	0.6956	0.6803	1	0.3197	-1.1709
26			1	**	0	0.9711	0.5917	1	0.4083	-0.7434
27			1		1	0.0138	0.9318	0	0.0682	2.5800
28			1		1	0.6916	0.5118	0	0.4882	-0.2780
29			1	**	0	0.9647	0.6090	1	0.3910	-0.8239
30			1		1	0.0119	0.9347	0	0.0653	2.6328
31			1		1	0.6717	0.5057	0	0.4943	-0.3052
32			1		1	0.6178	0.7009	0	0.2991	0.6176
33			1		1	0.6859	0.6828	0	0.3172	0.5230
34			1	**	0	0.7323	0.5240	1	0.4760	-0.4376
35			1		1	0.7124	0.6758	0	0.3242	0.4873
36			1		1	0.3637	0.7720	0	0.2280	1.0270
37			1		1	0.8376	0.5546	0	0.4454	-0.0864
38			0	**	1	0.8259	0.5513	0	0.4487	-0.1013
39			1	**	0	0.2484	0.8085	1	0.1915	-1.9338
40			1	**	0	0.6907	0.5115	1	0.4885	-0.3817
41			1	**	0	0.5308	0.7244	1	0.2756	-1.4064
42			1		1	0.6513	0.6920	0	0.3080	0.5706
43			1	**	0	0.9129	0.5757	1	0.4243	-0.6703
44			1		1	0.7976	0.5432	0	0.4568	-0.1378
45			1		1	0.8767	0.6325	0	0.3675	0.2738
46			1		1	0.0599	0.8903	0	0.1097	2.0004
47			1		1	0.8567	0.5600	0	0.4400	-0.0620
48			1		1	0.9364	0.6166	0	0.3834	0.1984
49			1		1	0.0111	0.9361	0	0.0639	2.6584

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
50			1	**	0	0.6612	0.6894	1	0.3106	-1.2179
51			1		1	0.2161	0.8197	0	0.1803	1.3556
52			1	**	0	0.9836	0.6040	1	0.3960	-0.8003
53			1	**	0	0.8211	0.5499	1	0.4501	-0.5535
54			1		1	0.3940	0.7630	0	0.2370	0.9710
55			1	**	0	0.9183	0.5772	1	0.4228	-0.6770
56			1	**	0	0.3724	0.7694	1	0.2306	-1.6717
57			1	**	0	0.5105	0.7300	1	0.2700	-1.4377
58			0		0	0.8665	0.6352	1	0.3648	-0.9477
59			1	**	0	0.5215	0.7270	1	0.2730	-1.4206
60			1	**	0	0.9813	0.5945	1	0.4055	-0.7562
61			1		1	0.5166	0.7283	0	0.2717	0.7672
62			1		1	0.7844	0.6568	0	0.3432	0.3922
63			1		1	0.6886	0.5109	0	0.4891	-0.2821
64			1	**	0	0.8029	0.6520	1	0.3480	-1.0292
65			0		0	0.8122	0.5474	1	0.4526	-0.5421
66			1	**	0	0.3146	0.7870	1	0.2130	-1.7852
67			1		1	0.2426	0.8105	0	0.1895	1.2870
68			1		1	0.6996	0.5142	0	0.4858	-0.2672
69			0	**	1	0.6265	0.6986	0	0.3014	0.6053
70			1		1	0.0657	0.8866	0	0.1134	1.9590
71			1		1	0.7582	0.5317	0	0.4683	-0.1892
72			1		1	0.9851	0.6035	0	0.3965	0.1373
73			0		0	0.1969	0.8267	1	0.1733	-2.0700
74			1	**	0	0.7030	0.5153	1	0.4847	-0.3984
75			1		1	0.5515	0.7188	0	0.2812	0.7141
76			1		1	0.7528	0.6651	0	0.3349	0.4335
77			1	**	0	0.3531	0.7752	1	0.2248	-1.7083
78			1		1	0.9065	0.5740	0	0.4260	0.0012
79			1		1	0.2988	0.7919	0	0.2081	1.1576
80			1	**	0	0.6882	0.5107	1	0.4893	-0.3783
81			1		1	0.4347	0.7512	0	0.2488	0.8998
82			1		1	0.7696	0.6607	0	0.3393	0.4116
83			1		1	0.6981	0.5138	0	0.4862	-0.2693
84			0	**	1	0.6648	0.5036	0	0.4964	-0.3146
85			1	**	0	0.7870	0.5401	1	0.4599	-0.5095
86			1		1	0.8862	0.6299	0	0.3701	0.2617
87			1		1	0.1427	0.8481	0	0.1519	1.5843
88			1	**	0	0.6875	0.5105	1	0.4895	-0.3774
89			1		1	0.9688	0.5910	0	0.4090	0.0795
90			1		1	0.8096	0.6502	0	0.3498	0.3596
91			1		1	0.7676	0.5344	0	0.4656	-0.1769
92			1	**	0	0.7371	0.5254	1	0.4746	-0.4439
93			1		1	0.1022	0.8666	0	0.1334	1.7529
94			0	**	1	0.5741	0.7126	0	0.2874	0.6806
95			1	**	0	0.6776	0.5075	1	0.4925	-0.3639
96			1	**	0	0.6321	0.6971	1	0.3029	-1.2584
97			1	**	0	0.6840	0.5095	1	0.4905	-0.3727
98			1		1	0.6788	0.5079	0	0.4921	-0.2955

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP	HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
99			1 **	0	0.8522	0.5587	1	0.4413	-0.5933
100			1 **	0	0.4343	0.7514	1	0.2486	-1.5616
101			1	1	0.4667	0.7422	0	0.2578	0.8465
102			1	1	0.7884	0.5405	0	0.4595	-0.1497
103			1 **	0	0.9171	0.6218	1	0.3782	-0.8838
104			1	1	0.7526	0.6652	0	0.3348	0.4338
105			1	1	0.2230	0.8173	0	0.1827	1.3371
106			1	1	0.5464	0.7202	0	0.2798	0.7218
107			1	1	0.9894	0.5967	0	0.4033	0.1054
108			0	0	0.7052	0.6777	1	0.3223	-1.1580
109			1 **	0	0.9409	0.5834	1	0.4166	-0.7055
110			1 **	0	0.9121	0.6231	1	0.3769	-0.8901
111			1	1	0.9935	0.6013	0	0.3987	0.1268
112			1 **	0	0.8135	0.6492	1	0.3508	-1.0156
113			1	1	0.9808	0.6047	0	0.3953	0.1427
114			1 **	0	0.9137	0.5759	1	0.4241	-0.6713
115			1	1	0.7444	0.6674	0	0.3326	0.4447
116			0	0	0.9829	0.5949	1	0.4051	-0.7581
117			1 **	0	0.8712	0.5641	1	0.4359	-0.6175
118			0	0	0.6679	0.6876	1	0.3124	-1.2087
119			0	0	0.7549	0.6646	1	0.3354	-1.0918
120			1	1	0.9069	0.5740	0	0.4260	0.0017
121			1	1	0.3678	0.7707	0	0.2293	1.0193
122			1 **	0	0.8052	0.6514	1	0.3486	-1.0263
123			1	1	0.9170	0.5768	0	0.4232	0.0144
124			1	1	0.3827	0.7663	0	0.2337	0.9916
125			1 **	0	0.8479	0.6401	1	0.3599	-0.9714
126			1	1	0.4500	0.7469	0	0.2531	0.8741
127			1	1	0.1072	0.8642	0	0.1358	1.7297
128			0	0	0.7685	0.6610	1	0.3390	-1.0739
129			0	0	0.5193	0.7276	1	0.2724	-1.4240
130			1	1	0.9607	0.6101	0	0.3899	0.1679
131			1	1	0.6747	0.6858	0	0.3142	0.5383
132			0	0	0.9766	0.5932	1	0.4068	-0.7503
133			1	1	0.6680	0.6876	0	0.3124	0.5476
134			1 **	0	0.9541	0.6119	1	0.3881	-0.8371
135			1	1	0.7229	0.5212	0	0.4788	-0.2360
136			1	1	0.8088	0.5464	0	0.4536	-0.1233
137			1	1	0.5086	0.7305	0	0.2695	0.7796
138			1 **	0	0.8412	0.6418	1	0.3582	-0.9800
139			1	1	0.0858	0.8751	0	0.1249	1.8367
140			1	1	0.0860	0.8750	0	0.1250	1.8355
141			1 **	0	0.6941	0.5125	1	0.4875	-0.3863
142			1 **	0	0.7548	0.6646	1	0.3354	-1.0919
143			1	1	0.7630	0.5331	0	0.4669	-0.1829
144			1	1	0.3733	0.7691	0	0.2309	1.0089
145			1	1	0.5533	0.7183	0	0.2817	0.7114
146			1	1	0.5358	0.7231	0	0.2769	0.7379
147			1	1	0.6724	0.5059	0	0.4941	-0.3043

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
148			1		1	0.9827	0.6042	0	0.3958	0.1403
149			1		1	0.0489	0.8978	0	0.1022	2.0881
150			0	**	1	0.7925	0.5417	0	0.4583	-0.1445
151			0		0	0.5968	0.7065	1	0.2935	-1.3087
152			1		1	0.6180	0.7009	0	0.2991	0.6173
153			1		1	0.8286	0.5520	0	0.4480	-0.0979
154			1	**	0	0.6579	0.5014	1	0.4986	-0.3368
155			1		1	0.8220	0.5502	0	0.4498	-0.1063
156			1		1	0.0093	0.9393	0	0.0607	2.7194
157			1		1	0.7414	0.5267	0	0.4733	-0.2113
158			0		0	0.7912	0.6550	1	0.3450	-1.0444
159			1		1	0.7546	0.5306	0	0.4694	-0.1940
160			1		1	0.3937	0.7631	0	0.2369	0.9716
161			1		1	0.1954	0.8273	0	0.1727	1.4134
162			0		0	0.7797	0.5380	1	0.4620	-0.5000
163			1		1	0.8060	0.6511	0	0.3489	0.3642
164			0		0	0.5338	0.7236	1	0.2764	-1.4018
165			1		1	0.4302	0.7525	0	0.2475	0.9075
166			1	**	0	0.8880	0.5688	1	0.4312	-0.6388
167			1	**	0	0.9241	0.6199	1	0.3801	-0.8749
168			1		1	0.8503	0.5582	0	0.4418	-0.0701
169			1		1	0.2210	0.8180	0	0.1820	1.3425
170			1	**	0	0.9522	0.5865	1	0.4135	-0.7197
171			1		1	0.0105	0.9371	0	0.0629	2.6763
172			1		1	0.0010	0.9660	0	0.0340	3.3966
173			1	**	0	0.9808	0.5943	1	0.4057	-0.7556
174			1		1	0.6708	0.6868	0	0.3132	0.5436
175			1		1	0.7150	0.6751	0	0.3249	0.4838
176			1	**	0	0.7395	0.5262	1	0.4738	-0.4471
177			1	**	0	0.6864	0.5102	1	0.4898	-0.3759
178			1		1	0.7646	0.6621	0	0.3379	0.4181
179			1	**	0	0.8976	0.6269	1	0.3731	-0.9083
180			1		1	0.0230	0.9202	0	0.0798	2.3922
181			1		1	0.7844	0.5394	0	0.4606	-0.1549
182			1	**	0	0.5375	0.7226	1	0.2774	-1.3962
183			1		1	0.3424	0.7784	0	0.2216	1.0681
184			1	**	0	0.9874	0.5961	1	0.4039	-0.7638
185			1	**	0	0.8926	0.5701	1	0.4299	-0.6446
186			1	**	0	0.6953	0.5129	1	0.4871	-0.3880
187			1		1	0.4431	0.7488	0	0.2512	0.8856
188			1		1	0.9550	0.5873	0	0.4127	0.0622
189			1		1	0.3945	0.7628	0	0.2372	0.9701
190			1		1	0.9373	0.6164	0	0.3836	0.1974
191			1		1	0.9603	0.5887	0	0.4113	0.0689
192			1	**	0	0.7844	0.5393	1	0.4607	-0.5060
193			0	**	1	0.7191	0.5201	0	0.4799	-0.2410
194			1		1	0.1070	0.8643	0	0.1357	1.7307
195			1	**	0	0.8985	0.6267	1	0.3733	-0.9072
196			1	**	0	0.6641	0.6886	1	0.3114	-1.2139

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
197			1	**	0	0.9565	0.6112	1	0.3888	-0.8342
198			1		1	0.0702	0.8839	0	0.1161	1.9293
199			1		1	0.2238	0.8170	0	0.1830	1.3352
200			1		1	0.7497	0.5292	0	0.4708	-0.2004
201			1		1	0.9578	0.6109	0	0.3891	0.1716
202			1	**	0	0.9669	0.6084	1	0.3916	-0.8212
203			1		1	0.8814	0.6312	0	0.3688	0.2678
204			1		1	0.2625	0.8038	0	0.1962	1.2391
205			1		1	0.6658	0.5039	0	0.4961	-0.3132
206			1		1	0.9951	0.6008	0	0.3992	0.1248
207			0		0	0.9242	0.6199	1	0.3801	-0.8748
208			1		1	0.6903	0.5114	0	0.4886	-0.2799
209			1	**	0	0.8157	0.6486	1	0.3514	-1.0127
210			0		0	0.9983	0.5991	1	0.4009	-0.7775
211			1		1	0.0885	0.8737	0	0.1263	1.8222
212			1		1	0.6493	0.6925	0	0.3075	0.5734
213			0	**	1	0.7612	0.6629	0	0.3371	0.4226
214			1		1	0.6962	0.5132	0	0.4868	-0.2718
215			1	**	0	0.1972	0.8266	1	0.1734	-2.0692
216			1		1	0.7783	0.5376	0	0.4624	-0.1628
217			0		0	0.3535	0.7750	1	0.2250	-1.7075
218			1		1	0.1319	0.8528	0	0.1472	1.6251
219			1		1	0.7230	0.6730	0	0.3270	0.4731
220			1		1	0.8626	0.5617	0	0.4383	-0.0545
221			1		1	0.8274	0.6455	0	0.3545	0.3367
222			1		1	0.0001	0.9821	0	0.0179	4.1275
223			1		1	0.2656	0.8027	0	0.1973	1.2318
224			1		1	0.0188	0.9252	0	0.0748	2.4691
225			1		1	0.7879	0.5404	0	0.4596	-0.1504
226			1		1	0.2733	0.8002	0	0.1998	1.2141
227			1		1	0.9529	0.5867	0	0.4133	0.0596
228			1		1	0.8842	0.6305	0	0.3695	0.2643
229			1	**	0	0.1694	0.8372	1	0.1628	-2.1537
230			1		1	0.6122	0.7024	0	0.2976	0.6255
231			1		1	0.5029	0.7321	0	0.2679	0.7886
232			0		0	0.5355	0.7231	1	0.2769	-1.3993
233			1		1	0.6965	0.6800	0	0.3200	0.5086
234			1		1	0.4883	0.7361	0	0.2639	0.8116
235			1		1	0.6783	0.5077	0	0.4923	-0.2961
236			1	**	0	0.7083	0.5168	1	0.4832	-0.4055
237			1	**	0	0.9490	0.6132	1	0.3868	-0.8436
238			1		1	0.1934	0.8280	0	0.1720	1.4193
239			1		1	0.6441	0.6939	0	0.3061	0.5806
240			1		1	0.6789	0.6847	0	0.3153	0.5325
241			0		0	0.7148	0.6752	1	0.3248	-1.1450
242			1		1	0.8230	0.5505	0	0.4495	-0.1050
243			1	**	0	0.7176	0.5196	1	0.4804	-0.4179
244			1		1	0.7717	0.6602	0	0.3398	0.4089
245			1	**	0	0.8850	0.5680	1	0.4320	-0.6350

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
246			1		1	0.1807	0.8329	0	0.1671	1.4574
247			0		0	0.9002	0.6262	1	0.3738	-0.9050
248			1		1	0.1321	0.8527	0	0.1473	1.6246
249			1		1	0.1113	0.8622	0	0.1378	1.7109
250			1		1	0.8106	0.5469	0	0.4531	-0.1210
251			0		0	0.6820	0.6839	1	0.3161	-1.1894
252			1	**	0	0.5828	0.7103	1	0.2897	-1.3289
253			0		0	0.2625	0.8038	1	0.1962	-1.9001
254			1		1	0.7719	0.5357	0	0.4643	-0.1713
255			1		1	0.9779	0.5935	0	0.4065	0.0909
256			1		1	0.7117	0.6760	0	0.3240	0.4882
257			1		1	0.8200	0.6475	0	0.3525	0.3462
258			1		1	0.1461	0.8467	0	0.1533	1.5721
259			1		1	0.8485	0.5577	0	0.4423	-0.0724
260			1	**	0	0.8098	0.5467	1	0.4533	-0.5390
261			1	**	0	0.7870	0.5401	1	0.4599	-0.5094
262			1		1	0.6391	0.6952	0	0.3048	0.5876
263			1		1	0.6760	0.5070	0	0.4930	-0.2993
264			1	**	0	0.7029	0.5152	1	0.4848	-0.3983
265			0	**	1	0.8480	0.6401	0	0.3599	0.3103

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	0	
2	1	

```
                         HISTOGRAM FOR GROUP       0

                                 CANONICAL DISCRIMINANT FUNCTION 1
       4 +                             1 1                                                 +
         :                             1 1                                                 :
         :                             1 1                                                 :
F        :                             1 1                                                 :
R      3 +                          1 11 11                                                +
E        :                          1 11 11                                                :
Q        :                          1 11 11                                                :
U        :                          1 11 11                                                :
E      2 +                          1 11111  1 1 1                                         +
N        :                          1 11111  1 1 1                                         :
C        :                          1 11111  1 1 1                                         :
Y        :                          1 11111  1 1 1                                         :
       1 +                   1 1 1  1111111  1 1111  11 11                                 +
         :                   1 1 1  1111111  1 1111  11 11                                 :
         :                   1 1 1  1111111  1 1111  11 11                                 :
         :                   1 1 1  1111111  1 1111  11 11                                 :
          X---------+---------+---------+---------+---------+---------+---------+---------X
        OUT      -3.0      -2.0      -1.0        .0       1.0       2.0       3.0         OUT
  CLASS   11111111111111111111111111111111111112222222222222222222222222222222222222222222222
CENTROIDS                                  1
                                 HISTOGRAM FOR GROUP       1

                                 CANONICAL DISCRIMINANT FUNCTION 1
      16 +                                                                                 +
         :                                    2                                            :
         :                                    22                                           :
F        :                                    22 2                                         :
R     12 +                                2   2222 2                                       +
E        :                                2   2222 2                                       :
Q        :                                2   2222 2   2                                   :
U        :                                2   2222 2  22                                   :
E      8 +                                2   2222 2  22                                   +
N        :                              2 22  2222 2 2222   2                              :
C        :                              2 22222222 2 2222 2 2                              :
Y        :                              2222222222 2 2222 222                              :
       4 +                            2   222222222222222222222 22  2 2                    +
         :                            222 222222222222222222222 222 222        2           :
         :                    2    2  2222222222222222222222222 222 222 2     22           :
         :                    22 22222222222222222222222222222222222222222  2222      2     2:
          X---------+---------+---------+---------+---------+---------+---------+---------X
        OUT      -3.0      -2.0      -1.0        .0       1.0       2.0       3.0         OUT
  CLASS   11111111111111111111111111111111111112222222222222222222222222222222222222222222222
CENTROIDS                                           2
```

ALL-GROUPS STACKED HISTOGRAM

CANONICAL DISCRIMINANT FUNCTION 1

```
      16 +                                     2                                           +
         :                                 2  22 2                                         :
         :                                 2  22 2                                         :
F        :                                 2  2222                                         :
R     12 +                                 2  2222 2                                       +
F        :                                 2  2222 2                                       :
Q        :                                 2  2222 2  22                                   :
U        :                              222   2222 2  22                                   :
E      8 +                              222  22222 2 2222                                  +
N        :                          2   2222 22222 2 2222   2                              :
C        :                          2 222222222222 2 2222 2 2                              :
Y        :                          2 22222222222222 22222222                              :
       4 +                          2221212222222222222222222 22  2 2                      +
         :                       2  1211211222222222222222222 222 222         2            :
         :                  22 2 2  1211111122121212222222222 222 222 2      22            :
         :                  21 121221111111122121111122112112222222222222  2222       2   2:
          X---------+---------+---------+---------+---------+---------+---------+---------X
        OUT      -3.0      -2.0      -1.0       .0       1.0       2.0       3.0      OUT
  CLASS   11111111111111111111111111111111111111222222222222222222222222222222222222222222222
CENTROIDS                                  1        2
```

CLASSIFICATION PROCESSING SUMMARY

265 CASES WERE PROCESSED.
  0 CASES WERE EXCLUDED FOR MISSING OR OUT-OF-RANGE GROUP CODES.
  0 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
265 CASES WERE USED FOR PRINTED OUTPUT.

```
- - - - - - - - - - - - - - - - - - - - -   D I S C R I M I N A N T   A N A L Y S I S   - - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R


ANALYSIS NUMBER..    2

NUMBER OF CANONICAL DISCRIMINANT FUNCTIONS..    1

LIST OF THE    5 VARIABLES USED..

VARIABLE  LABEL
--------  ----------------------------------------
A
FLY
GPA
NV
VB
```

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
1			1	**	0	0.4917	0.7146	1	0.2854	-1.4096
2			1	**	0	0.8578	0.6213	1	0.3787	-0.9011
3			1		1	0.9344	0.5689	0	0.4311	0.0275
4			1	**	0	0.9197	0.5651	1	0.4349	-0.6211
5			0		0	0.9466	0.5720	1	0.4280	-0.6549
6			0	**	1	0.7621	0.5235	0	0.4765	-0.1928
7			0		0	0.8824	0.6151	1	0.3849	-0.8698
8			1	**	0	0.6831	0.5016	1	0.4984	-0.3137
9			1		1	0.9062	0.6092	0	0.3908	0.2277
10			1	**	0	0.8470	0.5462	1	0.4538	-0.5289
11			1	**	0	0.8324	0.5424	1	0.4576	-0.5103
12			0	**	1	0.9407	0.5705	0	0.4295	0.0355
13			1	**	0	0.5127	0.7090	1	0.2910	-1.3766
14			1	**	0	0.8396	0.6258	1	0.3742	-0.9243
15			1		1	0.9256	0.5667	0	0.4333	0.0164
16			0		0	0.7878	0.6387	1	0.3613	-0.9911
17			1	**	0	0.8837	0.5558	1	0.4442	-0.5756
18			1	**	0	0.9734	0.5789	1	0.4211	-0.6886
19			1	**	0	0.9600	0.5755	1	0.4245	-0.6718
20			1		1	0.8149	0.5377	0	0.4623	-0.1243
21			1		1	0.8476	0.5464	0	0.4536	-0.0823
22			1		1	0.3504	0.7545	0	0.2455	1.0437
23			1	**	0	0.9452	0.5717	1	0.4283	-0.6531
24			1	**	0	0.7427	0.5182	1	0.4818	-0.3937
25			1	**	0	0.8069	0.6339	1	0.3661	-0.9663
26			1	**	0	0.9529	0.5737	1	0.4263	-0.6628
27			1		1	0.0147	0.9149	0	0.0851	2.5500
28			1		1	0.8284	0.5413	0	0.4587	-0.1069
29			1	**	0	0.5725	0.6932	1	0.3068	-1.2863
30			1		1	0.0106	0.9221	0	0.0779	2.6643
31			1	**	0	0.8765	0.6166	1	0.3834	-0.8773
32			1		1	0.1038	0.8454	0	0.1546	1.7368
33			1		1	0.9453	0.5994	0	0.4006	0.1785
34			1	**	0	0.7341	0.5158	1	0.4842	-0.3822
35			1		1	0.6547	0.6721	0	0.3279	0.5571
36			1		1	0.6974	0.6614	0	0.3386	0.4987
37			1	**	0	0.8767	0.5540	1	0.4460	-0.5667
38			0		0	0.9780	0.5801	1	0.4199	-0.6943
39			1	**	0	0.5354	0.7030	1	0.2970	-1.3417
40			1	**	0	0.7592	0.5227	1	0.4773	-0.4154
41			1	**	0	0.3804	0.7456	1	0.2544	-1.5990
42			1		1	0.4907	0.7149	0	0.2851	0.7991
43			1		1	0.7101	0.5092	0	0.4908	-0.2618
44			1		1	0.8549	0.5483	0	0.4517	-0.0730
45			1		1	0.7556	0.5217	0	0.4783	-0.2014
46			1		1	0.0899	0.8528	0	0.1472	1.8059
47			1		1	0.8415	0.5448	0	0.4552	-0.0902
48			1	**	0	0.7613	0.5233	1	0.4767	-0.4182
49			1		1	0.0583	0.8723	0	0.1277	2.0036

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
50			1	**	0	0.8412	0.6254	1	0.3746	-0.9223
51			1		1	0.3523	0.7539	0	0.2461	1.0400
52			1	**	0	0.7109	0.6580	1	0.3420	-1.0926
53			1		1	0.7845	0.5296	0	0.4704	-0.1637
54			1		1	0.7537	0.6472	0	0.3528	0.4236
55			1	**	0	0.8141	0.6322	1	0.3678	-0.9570
56			1	**	0	0.4560	0.7243	1	0.2757	-1.4674
57			1	**	0	0.6748	0.6671	1	0.3329	-1.1415
58			0		0	0.7823	0.5290	1	0.4710	-0.4456
59			1	**	0	0.4791	0.7180	1	0.2820	-1.4296
60			1	**	0	0.7372	0.5167	1	0.4833	-0.3863
61			1		1	0.6037	0.6852	0	0.3148	0.6290
62			1		1	0.4581	0.7237	0	0.2763	0.8518
63			1	**	0	0.8252	0.5404	1	0.4596	-0.5010
64			1	**	0	0.7404	0.6505	1	0.3495	-1.0532
65			0	**	1	0.7573	0.5222	0	0.4778	-0.1991
66			1	**	0	0.2770	0.7773	1	0.2227	-1.8090
67			1		1	0.3456	0.7559	0	0.2441	1.0530
68			1		1	0.8224	0.6301	0	0.3699	0.3343
69			0	**	1	0.6500	0.6733	0	0.3267	0.5637
70			1		1	0.3489	0.7549	0	0.2451	1.0465
71			1		1	0.6984	0.5059	0	0.4941	-0.2776
72			1	**	0	0.8649	0.5509	1	0.4491	-0.5518
73			0		0	0.1649	0.8177	1	0.1823	-2.1107
74			1		1	0.9040	0.5611	0	0.4389	-0.0108
75			1		1	0.3990	0.7403	0	0.2597	0.9533
76			1		1	0.6265	0.6793	0	0.3207	0.5965
77			1	**	0	0.7463	0.6491	1	0.3509	-1.0454
78			1		1	0.7845	0.5296	0	0.4704	-0.1636
79			1		1	0.2673	0.7805	0	0.2195	1.2192
80			1		1	0.7935	0.5320	0	0.4680	-0.1519
81			1		1	0.7949	0.6370	0	0.3630	0.3698
82			1		1	0.8840	0.6147	0	0.3853	0.2558
83			1		1	0.7508	0.5204	0	0.4796	-0.2077
84			0		0	0.9046	0.5612	1	0.4388	-0.6020
85			1	**	0	0.9206	0.5654	1	0.4346	-0.6222
86			1		1	0.9766	0.5915	0	0.4085	0.1392
87			1		1	0.1263	0.8344	0	0.1656	1.6386
88			1	**	0	0.7769	0.5275	1	0.4725	-0.4385
89			1		1	0.7054	0.5079	0	0.4921	-0.2683
90			1		1	0.9333	0.6024	0	0.3976	0.1936
91			1		1	0.9546	0.5971	0	0.4029	0.1668
92			1	**	0	0.9836	0.5815	1	0.4185	-0.7014
93			1		1	0.1097	0.8424	0	0.1576	1.7095
94			0	**	1	0.5210	0.7068	0	0.2932	0.7517
95			1	**	0	0.8144	0.6321	1	0.3679	-0.9566
96			1	**	0	0.4774	0.7185	1	0.2815	-1.4325
97			1		1	0.9657	0.5769	0	0.4231	0.0668
98			1	**	0	0.8518	0.6228	1	0.3772	-0.9087

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
99			1		1	0.7149	0.5105	0	0.4895	-0.2554
100			1	**	0	0.3531	0.7537	1	0.2463	-1.6504
101			1		1	0.6364	0.6768	0	0.3232	0.5826
102			1		1	0.9079	0.5621	0	0.4379	-0.0058
103			1	**	0	0.9540	0.5739	1	0.4261	-0.6642
104			1		1	0.6327	0.6777	0	0.3223	0.5878
105			1		1	0.3423	0.7569	0	0.2431	1.0594
106			1		1	0.6037	0.6852	0	0.3148	0.6289
107			1		1	0.9938	0.5841	0	0.4159	0.1021
108			0		0	0.5733	0.6930	1	0.3070	-1.2851
109			1	**	0	0.8411	0.5447	1	0.4553	-0.5214
110			1	**	0	0.9448	0.5716	1	0.4284	-0.6527
111			1		1	0.9947	0.5870	0	0.4130	0.1165
112			1	**	0	0.8191	0.6309	1	0.3691	-0.9506
113			1		1	0.5798	0.6913	0	0.3087	0.6635
114			1	**	0	0.8255	0.5406	1	0.4594	-0.5015
115			1		1	0.9127	0.6076	0	0.3924	0.2195
116			0		0	0.8006	0.6355	1	0.3645	-0.9745
117			1	**	0	0.7811	0.5287	1	0.4713	-0.4441
118			0		0	0.5135	0.7088	1	0.2912	-1.3753
119			0		0	0.6297	0.6785	1	0.3215	-1.2041
120			1	**	0	0.6898	0.5035	1	0.4965	-0.3228
121			1		1	0.1643	0.8180	0	0.1820	1.5005
122			1	**	0	0.8263	0.5408	1	0.4592	-0.5025
123			1		1	0.9679	0.5775	0	0.4225	0.0696
124			1		1	0.3659	0.7499	0	0.2501	1.0140
125			1	**	0	0.9643	0.5766	1	0.4234	-0.6771
126			1		1	0.4554	0.7245	0	0.2755	0.8563
127			1		1	0.0746	0.8616	0	0.1384	1.8928
128			0		0	0.7992	0.6359	1	0.3641	-0.9762
129			0		0	0.9953	0.5868	1	0.4132	-0.7278
130			1		1	0.8613	0.6204	0	0.3796	0.2846
131			1		1	0.9608	0.5955	0	0.4045	0.1590
132			0		0	0.8753	0.6169	1	0.3831	-0.8789
133			1		1	0.6714	0.6679	0	0.3321	0.5340
134			1	**	0	0.9475	0.5723	1	0.4277	-0.6561
135			1		1	0.7478	0.5196	0	0.4804	-0.2117
136			1		1	0.7053	0.5078	0	0.4922	-0.2683
137			1		1	0.6238	0.6800	0	0.3200	0.6004
138			1	**	0	0.6035	0.6852	1	0.3148	-1.2412
139			1		1	0.0823	0.8571	0	0.1429	1.8476
140			1		1	0.0771	0.8601	0	0.1399	1.8776
141			1		1	0.9248	0.5665	0	0.4335	0.0155
142			1	**	0	0.8856	0.5563	1	0.4437	-0.5780
143			1		1	0.6974	0.5056	0	0.4944	-0.2790
144			1		1	0.2169	0.7979	0	0.2021	1.3447
145			1		1	0.1658	0.8174	0	0.1826	1.4958
146			1		1	0.4226	0.7336	0	0.2664	0.9119
147			1	**	0	0.9706	0.5930	1	0.4070	-0.7588

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP	HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
148			1 **	0	0.8224	0.5397	1	0.4603	-0.4975
149			1	1	0.0196	0.9079	0	0.0921	2.4444
150			0	0	0.7377	0.5168	1	0.4832	-0.3870
151			0	0	0.1797	0.8118	1	0.1882	-2.0635
152			1	1	0.9574	0.5748	0	0.4252	0.0564
153			1 **	0	0.9913	0.5834	1	0.4166	-0.7110
154			1	1	0.7337	0.5157	0	0.4843	-0.2304
155			1 **	0	0.9259	0.5667	1	0.4333	-0.6289
156			1	1	0.0170	0.9114	0	0.0886	2.4965
157			1 **	0	0.8276	0.5411	1	0.4589	-0.5041
158			0	0	0.7175	0.6563	1	0.3437	-1.0837
159			1	1	0.8536	0.5480	0	0.4520	-0.0746
160			1	1	0.4740	0.7194	0	0.2806	0.8258
161			1	1	0.1029	0.8459	0	0.1541	1.7410
162			0	0	0.7563	0.5219	1	0.4781	-0.4116
163			1	1	0.4485	0.7264	0	0.2736	0.8678
164			0	0	0.5473	0.6998	1	0.3002	-1.3237
165			1	1	0.3001	0.7699	0	0.2301	1.1460
166			1 **	0	0.8463	0.5460	1	0.4540	-0.5280
167			1 **	0	0.8791	0.5546	1	0.4454	-0.5697
168			1	1	0.7261	0.5136	0	0.4864	-0.2404
169			1	1	0.0955	0.8497	0	0.1503	1.7767
170			1 **	0	0.5707	0.6937	1	0.3063	-1.2889
171			1	1	0.0311	0.8946	0	0.1054	2.2653
172			1	1	0.0049	0.9361	0	0.0639	2.9204
173			1 **	0	0.8546	0.6221	1	0.3779	-0.9051
174			1	1	0.5403	0.7017	0	0.2983	0.7222
175			1 **	0	0.7974	0.5331	1	0.4669	-0.4652
176			1 **	0	0.6842	0.5019	1	0.4981	-0.3151
177			1 **	0	0.7801	0.5284	1	0.4716	-0.4427
178			1	1	0.4952	0.7137	0	0.2863	0.7920
179			1 **	0	0.9878	0.5825	1	0.4175	-0.7067
180			1	1	0.0851	0.8554	0	0.1446	1.8316
181			1 **	0	0.9866	0.5822	1	0.4178	-0.7051
182			1 **	0	0.7365	0.6515	1	0.3485	-1.0584
183			1	1	0.3070	0.7677	0	0.2323	1.1313
184			1 **	0	0.8426	0.6250	1	0.3750	-0.9204
185			1 **	0	0.7786	0.5280	1	0.4720	-0.4408
186			1 **	0	0.7915	0.6378	1	0.3622	-0.9863
187			1	1	0.5787	0.6916	0	0.3084	0.6651
188			1	1	0.9749	0.5793	0	0.4207	0.0784
189			1	1	0.0896	0.8529	0	0.1471	1.8074
190			1	1	0.6035	0.6852	0	0.3148	0.6293
191			1	1	0.7329	0.5155	0	0.4845	-0.2314
192			1	1	0.7211	0.5122	0	0.4878	-0.2471
193			0 **	1	0.9323	0.5684	0	0.4316	0.0249
194			1	1	0.1767	0.8130	0	0.1870	1.4610
195			1 **	0	0.7207	0.5121	1	0.4879	-0.3644
196			1 **	0	0.7254	0.6543	1	0.3457	-1.0732

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
197			1	**	0	0.8766	0.5540	1	0.4460	-0.5666
198			1		1	0.0087	0.9261	0	0.0739	2.7334
199			1		1	0.3089	0.7671	0	0.2329	1.1274
200			1	**	0	0.8355	0.5432	1	0.4568	-0.5142
201			1	**	0	0.9401	0.6007	1	0.3993	-0.7971
202			1		1	0.7758	0.5272	0	0.4728	-0.1749
203			1	**	0	0.7016	0.5068	1	0.4932	-0.3387
204			1		1	0.4734	0.7196	0	0.2804	0.8269
205			1	**	0	0.7536	0.5212	1	0.4788	-0.4081
206			1		1	0.6508	0.6731	0	0.3269	0.5625
207			0		0	0.8750	0.6170	1	0.3830	-0.8792
208			1		1	0.8541	0.5481	0	0.4519	-0.0740
209			1	**	0	0.5414	0.7014	1	0.2986	-1.3326
210			0		0	0.8975	0.6114	1	0.3886	-0.8507
211			1		1	0.0416	0.8850	0	0.1150	2.1474
212			1		1	0.8528	0.6225	0	0.3775	0.2954
213			0	**	1	0.9124	0.5633	0	0.4367	-0.0002
214			1		1	0.8797	0.5548	0	0.4452	-0.0415
215			1	**	0	0.4473	0.7267	1	0.2733	-1.4818
216			1	**	0	0.7661	0.6441	1	0.3559	-1.0193
217			0		0	0.9400	0.5704	1	0.4296	-0.6466
218			1		1	0.1032	0.8457	0	0.1543	1.7392
219			1		1	0.9549	0.5970	0	0.4030	0.1664
220			1		1	0.7429	0.5183	0	0.4817	-0.2181
221			1		1	0.9853	0.5893	0	0.4107	0.1283
222			1		1	0.0001	0.9720	0	0.0280	3.9600
223			1		1	0.3013	0.7695	0	0.2305	1.1435
224			1		1	0.0001	0.9752	0	0.0248	4.1079
225			1	**	0	0.9330	0.5686	1	0.4314	-0.6379
226			1		1	0.1229	0.8360	0	0.1640	1.6526
227			1		1	0.7835	0.5293	0	0.4707	-0.1649
228			1		1	0.7943	0.5322	0	0.4678	-0.1508
229			1	**	0	0.4344	0.7303	1	0.2697	-1.5035
230			1		1	0.5252	0.7056	0	0.2944	0.7452
231			1		1	0.5079	0.7102	0	0.2898	0.7719
232			0		0	0.5546	0.6979	1	0.3021	-1.3128
233			1		1	0.7775	0.5277	0	0.4723	-0.1728
234			1		1	0.5347	0.7031	0	0.2969	0.7307
235			1	**	0	0.8078	0.5358	1	0.4642	-0.4787
236			1	**	0	0.7285	0.5143	1	0.4857	-0.3748
237			1	**	0	0.8108	0.6330	1	0.3670	-0.9613
238			1		1	0.2065	0.8017	0	0.1983	1.3732
239			1		1	0.5772	0.6920	0	0.3080	0.6673
240			1		1	0.5328	0.7036	0	0.2964	0.7336
241			0		0	0.6493	0.6735	1	0.3265	-1.1767
242			1		1	0.8830	0.5556	0	0.4444	-0.0373
243			1		1	0.8618	0.6203	0	0.3797	0.2839
244			1		1	0.5616	0.6961	0	0.3039	0.6903
245			1	**	0	0.9793	0.5804	1	0.4196	-0.6960

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
246			1		1	0.1715	0.8150	0	0.1850	1.4771
247			0		0	0.5363	0.7027	1	0.2973	-1.3404
248			1		1	0.1454	0.8259	0	0.1741	1.5658
249			1		1	0.0964	0.8492	0	0.1508	1.7723
250			1		1	0.7179	0.5114	0	0.4886	-0.2514
251			0	**	1	0.7272	0.5139	0	0.4861	-0.2390
252			1	**	0	0.8039	0.6347	1	0.3653	-0.9702
253			0		0	0.6835	0.6649	1	0.3351	-1.1296
254			1		1	0.7574	0.5222	0	0.4778	-0.1990
255			1	**	0	0.6824	0.5014	1	0.4986	-0.3127
256			1		1	0.7133	0.6573	0	0.3427	0.4772
257			1		1	0.7460	0.5191	0	0.4809	-0.2141
258			1		1	0.0944	0.8503	0	0.1497	1.7823
259			1	**	0	0.7947	0.5323	1	0.4677	-0.4617
260			1	**	0	0.8093	0.5362	1	0.4638	-0.4806
261			1	**	0	0.9377	0.6013	1	0.3987	-0.8000
262			1		1	0.5644	0.6954	0	0.3046	0.6862
263			1	**	0	0.7361	0.5164	1	0.4836	-0.3849
264			1	**	0	0.9982	0.5852	1	0.4148	-0.7196
265			0	**	1	0.7835	0.6398	0	0.3602	0.3846

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	0	
2	1	

```
                                   HISTOGRAM FOR GROUP       0

                                           CANONICAL DISCRIMINANT FUNCTION 1
        4 +                           1   1                                                 +
          :                           1   1                                                 :
          :                           1   1                                                 :
F         :                           1   1                                                 :
R       3 +                           1  11 1  1 1 1                                        +
E         :                           1  11 1  1 1 1                                        :
Q         :                           1  11 1  1 1 1                                        :
U         :                           1  11 1  1 1 1                                        :
E       2 +                   1       11111 11 1 1 1                                        +
N         :                   1       11111 11 1 1 1                                        :
C         :                   1       11111 11 1 1 1                                        :
Y         :                   1       11111 11 1 1 1                                        :
        1 +                   1      111111 11 1 1 1   1 1 1                                +
          :                   1      111111 11 1 1 1   1 1 1                                :
          :                   1      111111 11 1 1 1   1 1 1                                :
          :                   1      111111 11 1 1 1   1 1 1                                :
           X---------+---------+---------+---------+---------+---------+---------+---------X
         OUT       -3.0      -2.0      -1.0       .0        1.0       2.0       3.0        OUT
CLASS      11111111111111111111111111111111111111222222222222222222222222222222222222222222222
CENTROIDS                                   1
                                           HISTOGRAM FOR GROUP       1

                                           CANONICAL DISCRIMINANT FUNCTION 1
       20 +                                                                                 +
          :                                                                                 :
          :                                      2                                          :
F         :                                      2                                          :
R      15 +                                      2                                          +
E         :                                 2 2  2                                          :
Q         :                                 2 2222                                          :
U         :                                 2 2222                                          :
E      10 +                                 222222                                          +
N         :                              2  222222       22                                 :
C         :                              22 2222222222   22          2                      :
Y         :                              22 2222222222   22   2      2                      :
        5 +                             222 22222222222  222 22     22                      +
          :                          22 222 22222222222  222222   2 22                      :
          :                         222 22222222222222222222222   22222       2            2:
          :                      2222222222222222222222222222222222222222 22222 2          2:
           X---------+---------+---------+---------+---------+---------+---------+---------X
         OUT       -3.0      -2.0      -1.0       .0        1.0       2.0       3.0        OUT
CLASS      11111111111111111111111111111111111111222222222222222222222222222222222222222222222
CENTROIDS                                            2
```

ALL-GROUPS STACKED HISTOGRAM

CANONICAL DISCRIMINANT FUNCTION 1

```
      20 +                                      2                                          +
         :                                      2                                          :
         :                                 2    2                                          :
F        :                                 2  2 2                                          :
R     15 +                                 2  2 2                                          +
E        :                                 2 22 2                                          :
Q        :                              2  222222                                          :
U        :                              22 222222                                          :
E     10 +                              22 222222 2     2                                  +
N        :                              22 222222 2     22                                 :
C        :                           2 222 2222222222   22          2                      :
Y        :                           2 222 2222222222   222  2      2                      :
       5 +                          22 222 22222222222  222 22     22                      +
         :                          21 221 22222222222  222222   2 22                      :
         :                   1     2211111211121212122222222222  22222       2            2:
         :                   1  2222111111121112121212221212122222222222222 22222 2       2:
          X---------+---------+---------+---------+---------+---------+---------+---------X
        OUT       -3.0      -2.0      -1.0       .0       1.0       2.0       3.0       OUT
     CLASS 111111111111111111111111111111111111122222222222222222222222222222222222222222222
CENTROIDS                                  1        2
```

CLASSIFICATION PROCESSING SUMMARY

265 CASES WERE PROCESSED.
0 CASES WERE EXCLUDED FOR MISSING OR OUT-OF-RANGE GROUP CODES.
0 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
265 CASES WERE USED FOR PRINTED OUTPUT.

```
- - - - - - - - - - - - - - - - - - - - -   D I S C R I M I N A N T   A N A L Y S I S   - - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R


ANALYSIS NUMBER..   3

NUMBER OF CANONICAL DISCRIMINANT FUNCTIONS..   1

LIST OF THE   5 VARIABLES USED..

VARIABLE  LABEL
--------  ----------------------------------------
A
FLY
GPA
NV
VB
```

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
1			1	**	0	0.4917	0.7146	1	0.2854	-1.4096
2			1	**	0	0.8578	0.6213	1	0.3787	-0.9011
3			1		1	0.9344	0.5689	0	0.4311	0.0275
4			1	**	0	0.9197	0.5651	1	0.4349	-0.6211
5			0		0	0.9466	0.5720	1	0.4280	-0.6549
6			0	**	1	0.7621	0.5235	0	0.4765	-0.1928
7			0		0	0.8824	0.6151	1	0.3849	-0.8698
8			1	**	0	0.6831	0.5016	1	0.4984	-0.3137
9			1		1	0.9062	0.6092	0	0.3908	0.2277
10			1	**	0	0.8470	0.5462	1	0.4538	-0.5289
11			1	**	0	0.8324	0.5424	1	0.4576	-0.5103
12			0	**	1	0.9407	0.5705	0	0.4295	0.0355
13			1	**	0	0.5127	0.7090	1	0.2910	-1.3766
14			1	**	0	0.8396	0.6258	1	0.3742	-0.9243
15			1		1	0.9256	0.5667	0	0.4333	0.0164
16			0		0	0.7878	0.6387	1	0.3613	-0.9911
17			1	**	0	0.8837	0.5558	1	0.4442	-0.5756
18			1	**	0	0.9734	0.5789	1	0.4211	-0.6886
19			1	**	0	0.9600	0.5755	1	0.4245	-0.6718
20			1		1	0.8149	0.5377	0	0.4623	-0.1243
21			1		1	0.8476	0.5464	0	0.4536	-0.0823
22			1		1	0.3504	0.7545	0	0.2455	1.0437
23			1	**	0	0.9452	0.5717	1	0.4283	-0.6531
24			1	**	0	0.7427	0.5182	1	0.4818	-0.3937
25			1	**	0	0.8069	0.6339	1	0.3661	-0.9663
26			1	**	0	0.9529	0.5737	1	0.4263	-0.6628
27			1		1	0.0147	0.9149	0	0.0851	2.5500
28			1		1	0.8284	0.5413	0	0.4587	-0.1069
29			1	**	0	0.5725	0.6932	1	0.3068	-1.2863
30			1		1	0.0106	0.9221	0	0.0779	2.6643
31			1	**	0	0.8765	0.6166	1	0.3834	-0.8773
32			1		1	0.1038	0.8454	0	0.1546	1.7368
33			1		1	0.9453	0.5994	0	0.4006	0.1785
34			1	**	0	0.7341	0.5158	1	0.4842	-0.3822
35			1		1	0.6547	0.6721	0	0.3279	0.5571
36			1		1	0.6974	0.6614	0	0.3386	0.4987
37			1	**	0	0.8767	0.5540	1	0.4460	-0.5667
38			0		0	0.9780	0.5801	1	0.4199	-0.6943
39			1	**	0	0.5354	0.7030	1	0.2970	-1.3417
40			1	**	0	0.7592	0.5227	1	0.4773	-0.4154
41			1	**	0	0.3804	0.7456	1	0.2544	-1.5990
42			1		1	0.4907	0.7149	0	0.2851	0.7991
43			1		1	0.7101	0.5092	0	0.4908	-0.2618
44			1		1	0.8549	0.5483	0	0.4517	-0.0730
45			1		1	0.7556	0.5217	0	0.4783	-0.2014
46			1		1	0.0899	0.8528	0	0.1472	1.8059
47			1		1	0.8415	0.5448	0	0.4552	-0.0902
48			1	**	0	0.7613	0.5233	1	0.4767	-0.4182
49			1		1	0.0583	0.8723	0	0.1277	2.0036

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
50			1	**	0	0.8412	0.6254	1	0.3746	-0.9223
51			1		1	0.3523	0.7539	0	0.2461	1.0400
52			1	**	0	0.7109	0.6580	1	0.3420	-1.0926
53			1		1	0.7845	0.5296	0	0.4704	-0.1637
54			1		1	0.7537	0.6472	0	0.3528	0.4236
55			1	**	0	0.8141	0.6322	1	0.3678	-0.9570
56			1	**	0	0.4560	0.7243	1	0.2757	-1.4674
57			1	**	0	0.6748	0.6671	1	0.3329	-1.1415
58			0		0	0.7823	0.5290	1	0.4710	-0.4456
59			1	**	0	0.4791	0.7180	1	0.2820	-1.4296
60			1	**	0	0.7372	0.5167	1	0.4833	-0.3863
61			1		1	0.6037	0.6852	0	0.3148	0.6290
62			1		1	0.4581	0.7237	0	0.2763	0.8518
63			1	**	0	0.8252	0.5404	1	0.4596	-0.5010
64			1	**	0	0.7404	0.6505	1	0.3495	-1.0532
65			0	**	1	0.7573	0.5222	0	0.4778	-0.1991
66			1	**	0	0.2770	0.7773	1	0.2227	-1.8090
67			1		1	0.3456	0.7559	0	0.2441	1.0530
68			1		1	0.8224	0.6301	0	0.3699	0.3343
69			0	**	1	0.6500	0.6733	0	0.3267	0.5637
70			1		1	0.3489	0.7549	0	0.2451	1.0465
71			1		1	0.6984	0.5059	0	0.4941	-0.2776
72			1	**	0	0.8649	0.5509	1	0.4491	-0.5518
73			0		0	0.1649	0.8177	1	0.1823	-2.1107
74			1		1	0.9040	0.5611	0	0.4389	-0.0108
75			1		1	0.3990	0.7403	0	0.2597	0.9533
76			1		1	0.6265	0.6793	0	0.3207	0.5965
77			1	**	0	0.7463	0.6491	1	0.3509	-1.0454
78			1		1	0.7845	0.5296	0	0.4704	-0.1636
79			1		1	0.2673	0.7805	0	0.2195	1.2192
80			1		1	0.7935	0.5320	0	0.4680	-0.1519
81			1		1	0.7949	0.6370	0	0.3630	0.3698
82			1		1	0.8840	0.6147	0	0.3853	0.2558
83			1		1	0.7508	0.5204	0	0.4796	-0.2077
84			0		0	0.9046	0.5612	1	0.4388	-0.6020
85			1	**	0	0.9206	0.5654	1	0.4346	-0.6222
86			1		1	0.9766	0.5915	0	0.4085	0.1392
87			1		1	0.1263	0.8344	0	0.1656	1.6386
88			1	**	0	0.7769	0.5275	1	0.4725	-0.4385
89			1		1	0.7054	0.5079	0	0.4921	-0.2683
90			1		1	0.9333	0.6024	0	0.3976	0.1936
91			1		1	0.9546	0.5971	0	0.4029	0.1668
92			1	**	0	0.9836	0.5815	1	0.4185	-0.7014
93			1		1	0.1097	0.8424	0	0.1576	1.7095
94			0	**	1	0.5210	0.7068	0	0.2932	0.7517
95			1	**	0	0.8144	0.6321	1	0.3679	-0.9566
96			1	**	0	0.4774	0.7185	1	0.2815	-1.4325
97			1		1	0.9657	0.5769	0	0.4231	0.0668
98			1	**	0	0.8518	0.6228	1	0.3772	-0.9087

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
99			1		1	0.7149	0.5105	0	0.4895	-0.2554
100			1	**	0	0.3531	0.7537	1	0.2463	-1.6504
101			1		1	0.6364	0.6768	0	0.3232	0.5826
102			1		1	0.9079	0.5621	0	0.4379	-0.0058
103			1	**	0	0.9540	0.5739	1	0.4261	-0.6642
104			1		1	0.6327	0.6777	0	0.3223	0.5878
105			1		1	0.3423	0.7569	0	0.2431	1.0594
106			1		1	0.6037	0.6852	0	0.3148	0.6289
107			1		1	0.9938	0.5841	0	0.4159	0.1021
108			0		0	0.5733	0.6930	1	0.3070	-1.2851
109			1	**	0	0.8411	0.5447	1	0.4553	-0.5214
110			1	**	0	0.9448	0.5716	1	0.4284	-0.6527
111			1		1	0.9947	0.5870	0	0.4130	0.1165
112			1	**	0	0.8191	0.6309	1	0.3691	-0.9506
113			1		1	0.5798	0.6913	0	0.3087	0.6635
114			1	**	0	0.8255	0.5406	1	0.4594	-0.5015
115			1		1	0.9127	0.6076	0	0.3924	0.2195
116			0		0	0.8006	0.6355	1	0.3645	-0.9745
117			1	**	0	0.7811	0.5287	1	0.4713	-0.4441
118			0		0	0.5135	0.7088	1	0.2912	-1.3753
119			0		0	0.6297	0.6785	1	0.3215	-1.2041
120			1	**	0	0.6898	0.5035	1	0.4965	-0.3228
121			1		1	0.1643	0.8180	0	0.1820	1.5005
122			1	**	0	0.8263	0.5408	1	0.4592	-0.5025
123			1		1	0.9679	0.5775	0	0.4225	0.0696
124			1		1	0.3659	0.7499	0	0.2501	1.0140
125			1	**	0	0.9643	0.5766	1	0.4234	-0.6771
126			1		1	0.4554	0.7245	0	0.2755	0.8563
127			1		1	0.0746	0.8616	0	0.1384	1.8928
128			0		0	0.7992	0.6359	1	0.3641	-0.9762
129			0		0	0.9953	0.5868	1	0.4132	-0.7278
130			1		1	0.8613	0.6204	0	0.3796	0.2846
131			1		1	0.9608	0.5955	0	0.4045	0.1590
132			0		0	0.8753	0.6169	1	0.3831	-0.8789
133			1		1	0.6714	0.6679	0	0.3321	0.5340
134			1	**	0	0.9475	0.5723	1	0.4277	-0.6561
135			1		1	0.7478	0.5196	0	0.4804	-0.2117
136			1		1	0.7053	0.5078	0	0.4922	-0.2683
137			1		1	0.6238	0.6800	0	0.3200	0.6004
138			1	**	0	0.6035	0.6852	1	0.3148	-1.2412
139			1		1	0.0823	0.8571	0	0.1429	1.8476
140			1		1	0.0771	0.8601	0	0.1399	1.8776
141			1		1	0.9248	0.5665	0	0.4335	0.0155
142			1	**	0	0.8856	0.5563	1	0.4437	-0.5780
143			1		1	0.6974	0.5056	0	0.4944	-0.2790
144			1		1	0.2169	0.7979	0	0.2021	1.3447
145			1		1	0.1658	0.8174	0	0.1826	1.4958
146			1		1	0.4226	0.7336	0	0.2664	0.9119
147			1	**	0	0.9706	0.5930	1	0.4070	-0.7588

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
148			1	**	0	0.8224	0.5397	1	0.4603	-0.4975
149			1		1	0.0196	0.9079	0	0.0921	2.4444
150			0		0	0.7377	0.5168	1	0.4832	-0.3870
151			0		0	0.1797	0.8118	1	0.1882	-2.0635
152			1		1	0.9574	0.5748	0	0.4252	0.0564
153			1	**	0	0.9913	0.5834	1	0.4166	-0.7110
154			1		1	0.7337	0.5157	0	0.4843	-0.2304
155			1	**	0	0.9259	0.5667	1	0.4333	-0.6289
156			1		1	0.0170	0.9114	0	0.0886	2.4965
157			1	**	0	0.8276	0.5411	1	0.4589	-0.5041
158			0		0	0.7175	0.6563	1	0.3437	-1.0837
159			1		1	0.8536	0.5480	0	0.4520	-0.0746
160			1		1	0.4740	0.7194	0	0.2806	0.8258
161			1		1	0.1029	0.8459	0	0.1541	1.7410
162			0		0	0.7563	0.5219	1	0.4781	-0.4116
163			1		1	0.4485	0.7264	0	0.2736	0.8678
164			0		0	0.5473	0.6998	1	0.3002	-1.3237
165			1		1	0.3001	0.7699	0	0.2301	1.1460
1 6			1	**	0	0.8463	0.5460	1	0.4540	-0.5280
167			1	**	0	0.8791	0.5546	1	0.4454	-0.5697
168			1		1	0.7261	0.5136	0	0.4864	-0.2404
169			1		1	0.0955	0.8497	0	0.1503	1.7767
170			1	**	0	0.5707	0.6937	1	0.3063	-1.2889
171			1		1	0.0311	0.8946	0	0.1054	2.2653
172			1		1	0.0049	0.9361	0	0.0639	2.9204
173			1	**	0	0.8546	0.6221	1	0.3779	-0.9051
174			1		1	0.5403	0.7017	0	0.2983	0.7222
175			1	**	0	0.7974	0.5331	1	0.4669	-0.4652
176			1	**	0	0.6842	0.5019	1	0.4981	-0.3151
177			1	**	0	0.7801	0.5284	1	0.4716	-0.4427
178			1		1	0.4952	0.7137	0	0.2863	0.7920
179			1	**	0	0.9878	0.5825	1	0.4175	-0.7067
180			1		1	0.0851	0.8554	0	0.1446	1.8316
181			1	**	0	0.9866	0.5822	1	0.4178	-0.7051
182			1	**	0	0.7365	0.6515	1	0.3485	-1.0584
183			1		1	0.3070	0.7677	0	0.2323	1.1313
184			1	**	0	0.8426	0.6250	1	0.3750	-0.9204
185			1	**	0	0.7786	0.5280	1	0.4720	-0.4408
186			1	**	0	0.7915	0.6378	1	0.3622	-0.9863
187			1		1	0.5787	0.6916	0	0.3084	0.6651
188			1		1	0.9749	0.5793	0	0.4207	0.0784
189			1		1	0.0896	0.8529	0	0.1471	1.8074
190			1		1	0.6035	0.6852	0	0.3148	0.6293
191			1		1	0.7329	0.5155	0	0.4845	-0.2314
192			1		1	0.7211	0.5122	0	0.4878	-0.2471
193			0	**	1	0.9323	0.5684	0	0.4316	0.0249
194			1		1	0.1767	0.8130	0	0.1870	1.4610
195			1	**	0	0.7207	0.5121	1	0.4879	-0.3644
196			1	**	0	0.7254	0.6543	1	0.3457	-1.0732

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
197			1	**	0	0.8766	0.5540	1	0.4460	-0.5666
198			1		1	0.0087	0.9261	0	0.0739	2.7334
199			1		1	0.3089	0.7671	0	0.2329	1.1274
200			1	**	0	0.8355	0.5432	1	0.4568	-0.5142
201			1	**	0	0.9401	0.6007	1	0.3993	-0.7971
202			1		1	0.7758	0.5272	0	0.4728	-0.1749
203			1	**	0	0.7016	0.5068	1	0.4932	-0.3387
204			1		1	0.4734	0.7196	0	0.2804	0.8269
205			1	**	0	0.7536	0.5212	1	0.4788	-0.4081
206			1		1	0.6508	0.6731	0	0.3269	0.5625
207			0		0	0.8750	0.6170	1	0.3830	-0.8792
208			1		1	0.8541	0.5481	0	0.4519	-0.0740
209			1	**	0	0.5414	0.7014	1	0.2986	-1.3326
210			0		0	0.8975	0.6114	1	0.3886	-0.8507
211			1		1	0.0416	0.8850	0	0.1150	2.1474
212			1		1	0.8528	0.6225	0	0.3775	0.2954
213			0	**	1	0.9124	0.5633	0	0.4367	-0.0002
214			1		1	0.8797	0.5548	0	0.4452	-0.0415
215			1	**	0	0.4473	0.7267	1	0.2733	-1.4818
216			1	**	0	0.7661	0.6441	1	0.3559	-1.0193
217			0		0	0.9400	0.5704	1	0.4296	-0.6466
218			1		1	0.1032	0.8457	0	0.1543	1.7392
219			1		1	0.9549	0.5970	0	0.4030	0.1664
220			1		1	0.7429	0.5183	0	0.4817	-0.2181
221			1		1	0.9853	0.5893	0	0.4107	0.1283
222			1		1	0.0001	0.9720	0	0.0280	3.9600
223			1		1	0.3013	0.7695	0	0.2305	1.1435
224			1		1	0.0001	0.9752	0	0.0248	4.1079
225			1	**	0	0.9330	0.5686	1	0.4314	-0.6379
226			1		1	0.1229	0.8360	0	0.1640	1.6526
227			1		1	0.7835	0.5293	0	0.4707	-0.1649
228			1		1	0.7943	0.5322	0	0.4678	-0.1508
229			1	**	0	0.4344	0.7303	1	0.2697	-1.5035
230			1		1	0.5252	0.7056	0	0.2944	0.7452
231			1		1	0.5079	0.7102	0	0.2898	0.7719
232			0		0	0.5546	0.6979	1	0.3021	-1.3128
233			1		1	0.7775	0.5277	0	0.4723	-0.1728
234			1		1	0.5347	0.7031	0	0.2969	0.7307
235			1	**	0	0.8078	0.5358	1	0.4642	-0.4787
236			1	**	0	0.7285	0.5143	1	0.4857	-0.3748
237			1	**	0	0.8108	0.6330	1	0.3670	-0.9613
238			1		1	0.2065	0.8017	0	0.1983	1.3732
239			1		1	0.5772	0.6920	0	0.3080	0.6673
240			1		1	0.5328	0.7036	0	0.2964	0.7336
241			0		0	0.6493	0.6735	1	0.3265	-1.1767
242			1		1	0.8830	0.5556	0	0.4444	-0.0373
243			1		1	0.8618	0.6203	0	0.3797	0.2839
244			1		1	0.5616	0.6961	0	0.3039	0.6903
245			1	**	0	0.9793	0.5804	1	0.4196	-0.6960

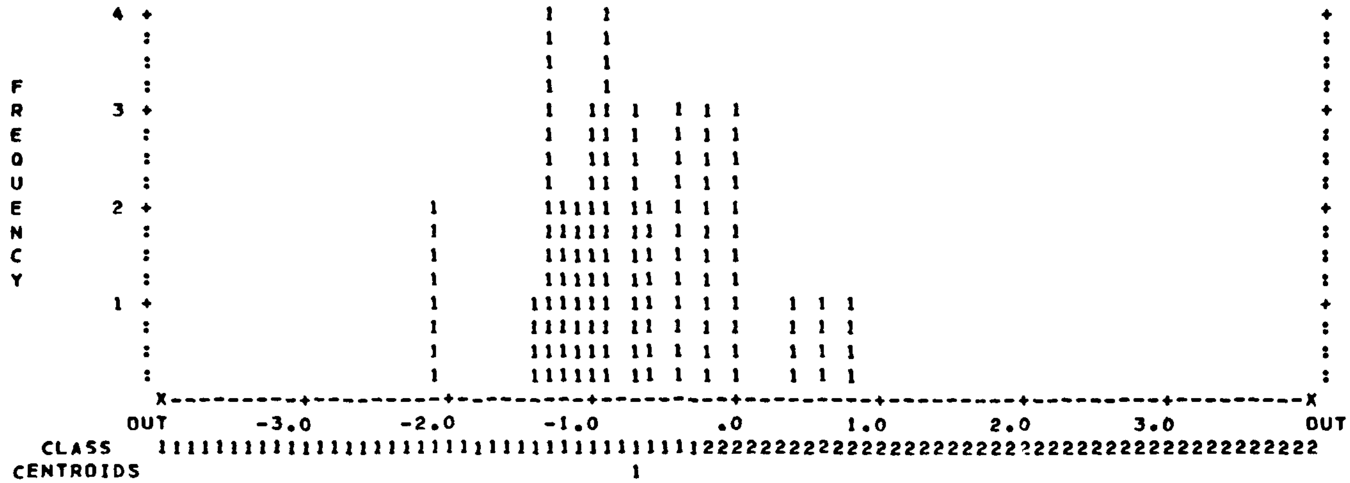
CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
246			1		1	0.1715	0.8150	0	0.1850	1.4771
247			0		0	0.5363	0.7027	1	0.2973	-1.3404
248			1		1	0.1454	0.8259	0	0.1741	1.5658
249			1		1	0.0964	0.8492	0	0.1508	1.7723
250			1		1	0.7179	0.5114	0	0.4886	-0.2514
251			0	**	1	0.7272	0.5139	0	0.4861	-0.2390
252			1	**	0	0.8039	0.6347	1	0.3653	-0.9702
253			0		0	0.6835	0.6649	1	0.3351	-1.1296
254			1		1	0.7574	0.5222	0	0.4778	-0.1990
255			1	**	0	0.6824	0.5014	1	0.4986	-0.3127
256			1		1	0.7133	0.6573	0	0.3427	0.4772
257			1		1	0.7460	0.5191	0	0.4809	-0.2141
258			1		1	0.0944	0.8503	0	0.1497	1.7823
259			1	**	0	0.7947	0.5323	1	0.4677	-0.4617
260			1	**	0	0.8093	0.5362	1	0.4638	-0.4806
261			1	**	0	0.9377	0.6013	1	0.3987	-0.8000
262			1		1	0.5644	0.6954	0	0.3046	0.6862
263			1	**	0	0.7361	0.5164	1	0.4836	-0.3849
264			1	**	0	0.9982	0.5852	1	0.4148	-0.7196
265			0	**	1	0.7835	0.6398	0	0.3602	0.3846

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	0	
2	1	

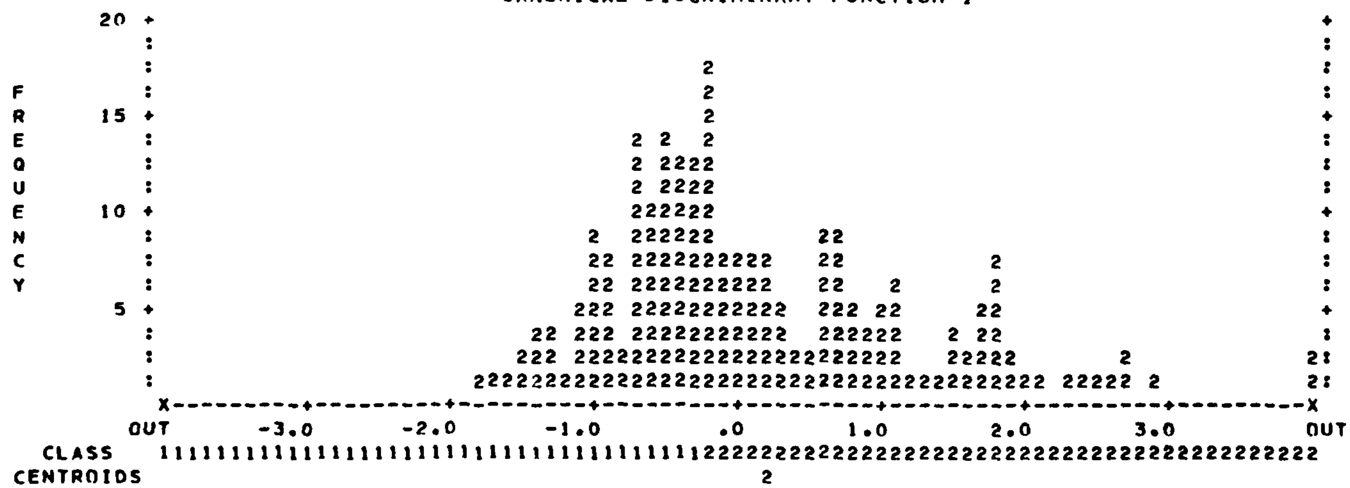
HISTOGRAM FOR GROUP 0

CANONICAL DISCRIMINANT FUNCTION 1



HISTOGRAM FOR GROUP 1

CANONICAL DISCRIMINANT FUNCTION 1



ALL-GROUPS STACKED HISTOGRAM

CANONICAL DISCRIMINANT FUNCTION 1

```
        20 +                                      2                                           +
           :                                      2                                           :
           :                                 2    2                                           :
F          :                                 2  2 2                                           :
R       15 +                                 2  2 2                                           +
E          :                                 2 22 2                                           :
Q          :                              2  222222                                           :
U          :                              22 222222                                           :
E       10 +                              22 222222 2     2                                   +
N          :                              22 222222 2     22                                  :
C          :                           2 222 2222222222   22          2                       :
Y          :                           2 222 2222222222   222  2      2                       :
         5 +                          22 222 22222222222  222 22     22                       +
           :                          21 221 22222222222  222222   2 22                       :
           :                   1     221111112112121212222222222   22222       2             2:
           :                   1  2222111111121121212122212121222222222222 22222  2          2:
            X---------+---------+---------+---------+---------+---------+---------+----------X
          OUT       -3.0      -2.0      -1.0        .0       1.0       2.0       3.0         OUT
     CLASS  111111111111111111111111111111111111112222222222222222222222222222222222222222222222
 CENTROIDS                                   1        2
```

CLASSIFICATION PROCESSING SUMMARY

265 CASES WERE PROCESSED.
0 CASES WERE EXCLUDED FOR MISSING OR OUT-OF-RANGE GROUP CODES.
0 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
265 CASES WERE USED FOR PRINTED OUTPUT.

```
- - - - - - - - - - - - - - - - - - - - -   D I S C R I M I N A N T   A N A L Y S I S   - - - - - - - - - - - - - - - - -

ON GROUPS DEFINED BY R


ANALYSIS NUMBER..    4

NUMBER OF CANONICAL DISCRIMINANT FUNCTIONS..    1

LIST OF THE    5 VARIABLES USED..

VARIABLE  LABEL
--------  ----------------------------------------
A
FLY
GPA
NV
VB
```

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
1			1	**	0	0.4917	0.7146	1	0.2854	-1.4096
2			1	**	0	0.8578	0.6213	1	0.3787	-0.9011
3			1		1	0.9344	0.5689	0	0.4311	0.0275
4			1	**	0	0.9197	0.5651	1	0.4349	-0.6211
5			0		0	0.9466	0.5720	1	0.4280	-0.6549
6			0	**	1	0.7621	0.5235	0	0.4765	-0.1928
7			0		0	0.8824	0.6151	1	0.3849	-0.8698
8			1	**	0	0.6831	0.5016	1	0.4984	-0.3137
9			1		1	0.9062	0.6092	0	0.3908	0.2277
10			1	**	0	0.8470	0.5462	1	0.4538	-0.5289
11			1	**	0	0.8324	0.5424	1	0.4576	-0.5103
12			0	**	1	0.9407	0.5705	0	0.4295	0.0355
13			1	**	0	0.5127	0.7090	1	0.2910	-1.3766
14			1	**	0	0.8396	0.6258	1	0.3742	-0.9243
15			1		1	0.9256	0.5667	0	0.4333	0.0164
16			0		0	0.7878	0.6387	1	0.3613	-0.9911
17			1	**	0	0.8837	0.5558	1	0.4442	-0.5756
18			1	**	0	0.9734	0.5789	1	0.4211	-0.6886
19			1	**	0	0.9600	0.5755	1	0.4245	-0.6718
20			1		1	0.8149	0.5377	0	0.4623	-0.1243
21			1		1	0.8476	0.5464	0	0.4536	-0.0823
22			1		1	0.3504	0.7545	0	0.2455	1.0437
23			1	**	0	0.9452	0.5717	1	0.4283	-0.6531
24			1	**	0	0.7427	0.5182	1	0.4818	-0.3937
25			1	**	0	0.8069	0.6339	1	0.3661	-0.9663
26			1	**	0	0.9529	0.5737	1	0.4263	-0.6628
27			1		1	0.0147	0.9149	0	0.0851	2.5500
28			1		1	0.8284	0.5413	0	0.4587	-0.1069
29			1	**	0	0.5725	0.6932	1	0.3068	-1.2863
30			1		1	0.0106	0.9221	0	0.0779	2.6643
31			1	**	0	0.8765	0.6166	1	0.3834	-0.8773
32			1		1	0.1038	0.8454	0	0.1546	1.7368
33			1		1	0.9453	0.5994	0	0.4006	0.1785
34			1	**	0	0.7341	0.5158	1	0.4842	-0.3822
35			1		1	0.6547	0.6721	0	0.3279	0.5571
36			1		1	0.6974	0.6614	0	0.3386	0.4987
37			1	**	0	0.8767	0.5540	1	0.4460	-0.5667
38			0		0	0.9780	0.5801	1	0.4199	-0.6943
39			1	**	0	0.5354	0.7030	1	0.2970	-1.3417
40			1	**	0	0.7592	0.5227	1	0.4773	-0.4154
41			1	**	0	0.3804	0.7456	1	0.2544	-1.5990
42			1		1	0.4907	0.7149	0	0.2851	0.7991
43			1		1	0.7101	0.5092	0	0.4908	-0.2618
44			1		1	0.8549	0.5483	0	0.4517	-0.0730
45			1		1	0.7556	0.5217	0	0.4783	-0.2014
46			1		1	0.0899	0.8528	0	0.1472	1.8059
47			1		1	0.8415	0.5448	0	0.4552	-0.0902
48			1	**	0	0.7613	0.5233	1	0.4767	-0.4182
49			1		1	0.0583	0.8723	0	0.1277	2.0036

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
50			1	**	0	0.8412	0.6254	1	0.3746	-0.9223
51			1		1	0.3523	0.7539	0	0.2461	1.0400
52			1	**	0	0.7109	0.6580	1	0.3420	-1.0926
53			1		1	0.7845	0.5296	0	0.4704	-0.1637
54			1		1	0.7537	0.6472	0	0.3528	0.4236
55			1	**	0	0.8141	0.6322	1	0.3678	-0.9570
56			1	**	0	0.4560	0.7243	1	0.2757	-1.4674
57			1	**	0	0.6748	0.6671	1	0.3329	-1.1415
58			0		0	0.7823	0.5290	1	0.4710	-0.4456
59			1	**	0	0.4791	0.7180	1	0.2820	-1.4296
60			1	**	0	0.7372	0.5167	1	0.4833	-0.3863
61			1		1	0.6037	0.6852	0	0.3148	0.6290
62			1		1	0.4581	0.7237	0	0.2763	0.8518
63			1	**	0	0.8252	0.5404	1	0.4596	-0.5010
64			1	**	0	0.7404	0.6505	1	0.3495	-1.0532
65			0	**	1	0.7573	0.5222	0	0.4778	-0.1991
66			1	**	0	0.2770	0.7773	1	0.2227	-1.8090
67			1		1	0.3456	0.7559	0	0.2441	1.0530
68			1		1	0.8224	0.6301	0	0.3699	0.3343
69			0	**	1	0.6500	0.6733	0	0.3267	0.5637
70			1		1	0.3489	0.7549	0	0.2451	1.0465
71			1		1	0.6984	0.5059	0	0.4941	-0.2776
72			1	**	0	0.8649	0.5509	1	0.4491	-0.5518
73			0		0	0.1649	0.8177	1	0.1823	-2.1107
74			1		1	0.9040	0.5611	0	0.4389	-0.0108
75			1		1	0.3990	0.7403	0	0.2597	0.9533
76			1		1	0.6265	0.6793	0	0.3207	0.5965
77			1	**	0	0.7463	0.6491	1	0.3509	-1.0454
78			1		1	0.7845	0.5296	0	0.4704	-0.1636
79			1		1	0.2673	0.7805	0	0.2195	1.2192
80			1		1	0.7935	0.5320	0	0.4680	-0.1519
81			1		1	0.7949	0.6370	0	0.3630	0.3698
82			1		1	0.8840	0.6147	0	0.3853	0.2558
83			1		1	0.7508	0.5204	0	0.4796	-0.2077
84			0		0	0.9046	0.5612	1	0.4388	-0.6020
85			1	**	0	0.9206	0.5654	1	0.4346	-0.6222
86			1		1	0.9766	0.5915	0	0.4085	0.1392
87			1		1	0.1263	0.8344	0	0.1656	1.6386
88			1	**	0	0.7769	0.5275	1	0.4725	-0.4385
89			1		1	0.7054	0.5079	0	0.4921	-0.2683
90			1		1	0.9333	0.6024	0	0.3976	0.1936
91			1		1	0.9546	0.5971	0	0.4029	0.1668
92			1	**	0	0.9836	0.5815	1	0.4185	-0.7014
93			1		1	0.1097	0.8424	0	0.1576	1.7095
94			0	**	1	0.5210	0.7068	0	0.2932	0.7517
95			1	**	0	0.8144	0.6321	1	0.3679	-0.9566
96			1	**	0	0.4774	0.7185	1	0.2815	-1.4325
97			1		1	0.9657	0.5769	0	0.4231	0.0668
98			1	**	0	0.8518	0.6228	1	0.3772	-0.9087

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
99			1		1	0.7149	0.5105	0	0.4895	-0.2554
100			1	**	0	0.3531	0.7537	1	0.2463	-1.6504
101			1		1	0.6364	0.6768	0	0.3232	0.5826
102			1		1	0.9079	0.5621	0	0.4379	-0.0058
103			1	**	0	0.9540	0.5739	1	0.4261	-0.6642
104			1		1	0.6327	0.6777	0	0.3223	0.5878
105			1		1	0.3423	0.7569	0	0.2431	1.0594
106			1		1	0.6037	0.6852	0	0.3148	0.6289
107			1		1	0.9938	0.5841	0	0.4159	0.1021
108			0		0	0.5733	0.6930	1	0.3070	-1.2851
109			1	**	0	0.8411	0.5447	1	0.4553	-0.5214
110			1	**	0	0.9448	0.5716	1	0.4284	-0.6527
111			1		1	0.9947	0.5870	0	0.4130	0.1165
112			1	**	0	0.8191	0.6309	1	0.3691	-0.9506
113			1		1	0.5798	0.6913	0	0.3087	0.6635
114			1	**	0	0.8255	0.5406	1	0.4594	-0.5015
115			1		1	0.9127	0.6076	0	0.3924	0.2195
116			0		0	0.8006	0.6355	1	0.3645	-0.9745
117			1	**	0	0.7811	0.5287	1	0.4713	-0.4441
118			0		0	0.5135	0.7088	1	0.2912	-1.3753
119			0		0	0.6297	0.6785	1	0.3215	-1.2041
120			1	**	0	0.6898	0.5035	1	0.4965	-0.3228
121			1		1	0.1643	0.8180	0	0.1820	1.5005
122			1	**	0	0.8263	0.5408	1	0.4592	-0.5025
123			1		1	0.9679	0.5775	0	0.4225	0.0696
124			1		1	0.3659	0.7499	0	0.2501	1.0140
125			1	**	0	0.9643	0.5766	1	0.4234	-0.6771
126			1		1	0.4554	0.7245	0	0.2755	0.8563
127			1		1	0.0746	0.8616	0	0.1384	1.8928
128			0		0	0.7992	0.6359	1	0.3641	-0.9762
129			0		0	0.9953	0.5868	1	0.4132	-0.7278
130			1		1	0.8613	0.6204	0	0.3796	0.2846
131			1		1	0.9608	0.5955	0	0.4045	0.1590
132			0		0	0.8753	0.6169	1	0.3831	-0.8789
133			1		1	0.6714	0.6679	0	0.3321	0.5340
134			1	**	0	0.9475	0.5723	1	0.4277	-0.6561
135			1		1	0.7478	0.5196	0	0.4804	-0.2117
136			1		1	0.7053	0.5078	0	0.4922	-0.2683
137			1		1	0.6238	0.6800	0	0.3200	0.6004
138			1	**	0	0.6035	0.6852	1	0.3148	-1.2412
139			1		1	0.0823	0.8571	0	0.1429	1.8476
140			1		1	0.0771	0.8601	0	0.1399	1.8776
141			1		1	0.9248	0.5665	0	0.4335	0.0155
142			1	**	0	0.8856	0.5563	1	0.4437	-0.5780
143			1		1	0.6974	0.5056	0	0.4944	-0.2790
144			1		1	0.2169	0.7979	0	0.2021	1.3447
145			1		1	0.1658	0.8174	0	0.1826	1.4958
146			1		1	0.4226	0.7336	0	0.2664	0.9119
147			1	**	0	0.9706	0.5930	1	0.4070	-0.7588

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
148			1	**	0	0.8224	0.5397	1	0.4603	-0.4975
149			1		1	0.0196	0.9079	0	0.0921	2.4444
150			0		0	0.7377	0.5168	1	0.4832	-0.3870
151			0		0	0.1797	0.8118	1	0.1882	-2.0635
152			1		1	0.9574	0.5748	0	0.4252	0.0564
153			1	**	0	0.9913	0.5834	1	0.4166	-0.7110
154			1		1	0.7337	0.5157	0	0.4843	-0.2304
155			1	**	0	0.9259	0.5667	1	0.4333	-0.6289
156			1		1	0.0170	0.9114	0	0.0886	2.4965
157			1	**	0	0.8276	0.5411	1	0.4589	-0.5041
158			0		0	0.7175	0.6563	1	0.3437	-1.0837
159			1		1	0.8536	0.5480	0	0.4520	-0.0746
160			1		1	0.4740	0.7194	0	0.2806	0.8258
161			1		1	0.1029	0.8459	0	0.1541	1.7410
162			0		0	0.7563	0.5219	1	0.4781	-0.4116
163			1		1	0.4485	0.7264	0	0.2736	0.8678
164			0		0	0.5473	0.6998	1	0.3002	-1.3237
165			1		1	0.3001	0.7699	0	0.2301	1.1460
166			1	**	0	0.8463	0.5460	1	0.4540	-0.5280
167			1	**	0	0.8791	0.5546	1	0.4454	-0.5697
168			1		1	0.7261	0.5136	0	0.4864	-0.2404
169			1		1	0.0955	0.8497	0	0.1503	1.7767
170			1	**	0	0.5707	0.6937	1	0.3063	-1.2889
171			1		1	0.0311	0.8946	0	0.1054	2.2653
172			1		1	0.0049	0.9361	0	0.0639	2.9204
173			1	**	0	0.8546	0.6221	1	0.3779	-0.9051
174			1		1	0.5403	0.7017	0	0.2983	0.7222
175			1	**	0	0.7974	0.5331	1	0.4669	-0.4652
176			1	**	0	0.6842	0.5019	1	0.4981	-0.3151
177			1	**	0	0.7801	0.5284	1	0.4716	-0.4427
178			1		1	0.4952	0.7137	0	0.2863	0.7920
179			1	**	0	0.9878	0.5825	1	0.4175	-0.7067
180			1		1	0.0851	0.8554	0	0.1446	1.8316
181			1	**	0	0.9866	0.5822	1	0.4178	-0.7051
182			1	**	0	0.7365	0.6515	1	0.3485	-1.0584
183			1		1	0.3070	0.7677	0	0.2323	1.1313
184			1	**	0	0.8426	0.6250	1	0.3750	-0.9204
185			1	**	0	0.7786	0.5280	1	0.4720	-0.4408
186			1	**	0	0.7915	0.6378	1	0.3622	-0.9863
187			1		1	0.5787	0.6916	0	0.3084	0.6651
188			1		1	0.9749	0.5793	0	0.4207	0.0784
189			1		1	0.0896	0.8529	0	0.1471	1.8074
190			1		1	0.6035	0.6852	0	0.3148	0.6293
191			1		1	0.7329	0.5155	0	0.4845	-0.2314
192			1		1	0.7211	0.5122	0	0.4878	-0.2471
193			0	**	1	0.9323	0.5684	0	0.4316	0.0249
194			1		1	0.1767	0.8130	0	0.1870	1.4610
195			1	**	0	0.7207	0.5121	1	0.4879	-0.3644
196			1	**	0	0.7254	0.6543	1	0.3457	-1.0732

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
197			1	**	0	0.8766	0.5540	1	0.4460	-0.5666
198			1		1	0.0087	0.9261	0	0.0739	2.7334
199			1		1	0.3089	0.7671	0	0.2329	1.1274
200			1	**	0	0.8355	0.5432	1	0.4568	-0.5142
201			1	**	0	0.9401	0.6007	1	0.3993	-0.7971
202			1		1	0.7758	0.5272	0	0.4728	-0.1749
203			1	**	0	0.7016	0.5068	1	0.4932	-0.3387
204			1		1	0.4734	0.7196	0	0.2804	0.8269
205			1	**	0	0.7536	0.5212	1	0.4788	-0.4081
206			1		1	0.6508	0.6731	0	0.3269	0.5625
207			0		0	0.8750	0.6170	1	0.3830	-0.8792
208			1		1	0.8541	0.5481	0	0.4519	-0.0740
209			1	**	0	0.5414	0.7014	1	0.2986	-1.3326
210			0		0	0.8975	0.6114	1	0.3886	-0.8507
211			1		1	0.0416	0.8850	0	0.1150	2.1474
212			1		1	0.8528	0.6225	0	0.3775	0.2954
213			0	**	1	0.9124	0.5633	0	0.4367	-0.0002
214			1		1	0.8797	0.5548	0	0.4452	-0.0415
215			1	**	0	0.4473	0.7267	1	0.2733	-1.4818
216			1	**	0	0.7661	0.6441	1	0.3559	-1.0193
217			0		0	0.9400	0.5704	1	0.4296	-0.6466
218			1		1	0.1032	0.8457	0	0.1543	1.7392
219			1		1	0.9549	0.5970	0	0.4030	0.1664
220			1		1	0.7429	0.5183	0	0.4817	-0.2181
221			1		1	0.9853	0.5893	0	0.4107	0.1283
222			1		1	0.0001	0.9720	0	0.0280	3.9600
223			1		1	0.3013	0.7695	0	0.2305	1.1435
224			1		1	0.0001	0.9752	0	0.0248	4.1079
225			1	**	0	0.9330	0.5686	1	0.4314	-0.6379
226			1		1	0.1229	0.8360	0	0.1640	1.6526
227			1		1	0.7835	0.5293	0	0.4707	-0.1649
228			1		1	0.7943	0.5322	0	0.4678	-0.1508
229			1	**	0	0.4344	0.7303	1	0.2697	-1.5035
230			1		1	0.5252	0.7056	0	0.2944	0.7452
231			1		1	0.5079	0.7102	0	0.2898	0.7719
232			0		0	0.5546	0.6979	1	0.3021	-1.3128
233			1		1	0.7775	0.5277	0	0.4723	-0.1728
234			1		1	0.5347	0.7031	0	0.2969	0.7307
235			1	**	0	0.8078	0.5358	1	0.4642	-0.4787
236			1	**	0	0.7285	0.5143	1	0.4857	-0.3748
237			1	**	0	0.8108	0.6330	1	0.3670	-0.9613
238			1		1	0.2065	0.8017	0	0.1983	1.3732
239			1		1	0.5772	0.6920	0	0.3080	0.6673
240			1		1	0.5328	0.7036	0	0.2964	0.7336
241			0		0	0.6493	0.6735	1	0.3265	-1.1767
242			1		1	0.8830	0.5556	0	0.4444	-0.0373
243			1		1	0.8618	0.6203	0	0.3797	0.2839
244			1		1	0.5616	0.6961	0	0.3039	0.6903
245			1	**	0	0.9793	0.5804	1	0.4196	-0.6960

CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIMINANT SCORES...
246			1		1	0.1715	0.8150	0	0.1850	1.4771
247			0		0	0.5363	0.7027	1	0.2973	-1.3404
248			1		1	0.1454	0.8259	0	0.1741	1.5658
249			1		1	0.0964	0.8492	0	0.1508	1.7723
250			1		1	0.7179	0.5114	0	0.4886	-0.2514
251			0	**	1	0.7272	0.5139	0	0.4861	-0.2390
252			1	**	0	0.8039	0.6347	1	0.3653	-0.9702
253			0		0	0.6835	0.6649	1	0.3351	-1.1296
254			1		1	0.7574	0.5222	0	0.4778	-0.1990
255			1	**	0	0.6824	0.5014	1	0.4986	-0.3127
256			1		1	0.7133	0.6573	0	0.3427	0.4772
257			1		1	0.7460	0.5191	0	0.4809	-0.2141
258			1		1	0.0944	0.8503	0	0.1497	1.7823
259			1	**	0	0.7947	0.5323	1	0.4677	-0.4617
260			1	**	0	0.8093	0.5362	1	0.4638	-0.4806
261			1	**	0	0.9377	0.6013	1	0.3987	-0.8000
262			1		1	0.5644	0.6954	0	0.3046	0.6862
263			1	**	0	0.7361	0.5164	1	0.4836	-0.3849
264			1	**	0	0.9982	0.5852	1	0.4148	-0.7196
265			0	**	1	0.7835	0.6398	0	0.3602	0.3846

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	0	
2	1	

```
                           HISTOGRAM FOR GROUP       0

                                   CANONICAL DISCRIMINANT FUNCTION 1
        4 +                           1   1                                                 +
          :                           1   1                                                 :
          :                           1   1                                                 :
 F        :                           1   1                                                 :
 R      3 +                           1  11 1  1 1 1                                        +
 E        :                           1  11 1  1 1 1                                        :
 Q        :                           1  11 1  1 1 1                                        :
 U        :                           1  11 1  1 1 1                                        :
 E      2 +                   1       11111 11 1 1 1                                        +
 N        :                   1       11111 11 1 1 1                                        :
 C        :                   1       11111 11 1 1 1                                        :
 Y        :                   1       11111 11 1 1 1                                        :
        1 +                   1      111111 11 1 1 1   1 1 1                                +
          :                   1      111111 11 1 1 1   1 1 1                                :
          :                   1      111111 11 1 1 1   1 1 1                                :
          :                   1      111111 11 1 1 1   1 1 1                                :
           X---------+---------+---------+---------+---------+---------+---------+---------X
         OUT      -3.0      -2.0      -1.0        .0       1.0       2.0       3.0         OUT
   CLASS   11111111111111111111111111111111111111222222222222222222222222222222222222222222222
 CENTROIDS                                  1
                                   HISTOGRAM FOR GROUP       1

                                   CANONICAL DISCRIMINANT FUNCTION 1
       20 +                                                                                 +
          :                                                                                 :
          :                                      2                                          :
 F        :                                      2                                          :
 R     15 +                                      2                                          +
 E        :                                 2 2  2                                          :
 Q        :                                 2 2222                                          :
 U        :                                 2 2222                                          :
 E     10 +                                 222222                                          +
 N        :                              2  222222       22                                 :
 C        :                              22 2222222222   22          2                      :
 Y        :                              22 2222222222   22   2      2                      :
        5 +                             222 22222222222  222 22     22                      +
          :                          22 222 22222222222  222222   2 22                      :
          :                         222 22222222222222222222222   22222       2            2:
          :                      2222222222222222222222222222222222222222 22222 2          2:
           X---------+---------+---------+---------+---------+---------+---------+---------X
         OUT      -3.0      -2.0      -1.0        .0       1.0       2.0       3.0         OUT
   CLASS   11111111111111111111111111111111111111222222222222222222222222222222222222222222222
 CENTROIDS                                           2
```

ALL-GROUPS STACKED HISTOGRAM

CANONICAL DISCRIMINANT FUNCTION 1

```
        20 +                                      2                                          +
           :                                      2                                          :
           :                                 2    2                                          :
F          :                                 2  2 2                                          :
R       15 +                                 2  2 2                                          +
E          :                                 2 22 2                                          :
Q          :                              2  222222                                          :
U          :                              22 222222                                          :
E       10 +                              22 222222 2     2                                  +
N          :                              22 222222 2     22                                 :
C          :                           2 222 2222222222   22          2                      :
Y          :                           2 222 2222222222   222  2      2                      :
         5 +                          22 222 22222222222  222 22     22                      +
           :                          21 221 22222222222  222222   2 22                      :
           :                   1     221111121121212121222222222   22222       2            2:
           :                   1  2222111111211212121222121212222222222222 22222 2          2:
            X---------+---------+---------+---------+---------+---------+---------+---------X
          OUT      -3.0      -2.0      -1.0        .0       1.0       2.0       3.0       OUT
    CLASS   11111111111111111111111111111111111111222222222222222222222222222222222222222222222
CENTROIDS                                        1        2
```

CLASSIFICATION PROCESSING SUMMARY

265 CASES WERE PROCESSED.
0 CASES WERE EXCLUDED FOR MISSING OR OUT-OF-RANGE GROUP CODES.
0 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
265 CASES WERE USED FOR PRINTED OUTPUT.

APPENDIX J

**** MULTIPLE REGRESSION ****

CORRELATION, COVARIANCE, 1-TAILED SIG, CROSS-PRODUCT:

	PERF	SEX	GIS	A	FLY	SATE	GPA	M
PERF	1.000	.012	.059	.081	.283	.033	-.032	-.031
	15564.635	.311	7667.044	3.418	492.360	568.894	-176.256	-7.668
	.999	.426	.175	.097	.000	.300	.305	.311
	3953417.318	78.906	1947429.129	868.259	125059.341	144499.000	-44768.965	-1947.671
SEX	.012	1.000	-.244	-.080	-.073	-.184	.001	.000
	.311	.045	-54.131	-.006	-.216	-5.409	.009	.000
	.426	.999	.000	.102	.122	.002	.494	.499
	78.906	11.435	-13749.224	-1.447	-54.953	-1374.000	2.212	-.024
GIS	.059	-.244	1.000	.017	-.017	.802	.499	-.154
	7667.044	-54.131	1090919.887	5.974	-248.480	115948.604	23013.905	-319.498
	.175	.000	.999	.393	.393	.000	.000	.007
	1947429.129	-13749.224	277093651.349	1517.365	-63113.898	29450945.333	5845531.792	-81152.384
A	.081	-.080	.017	1.000	-.038	.000	-.022	.092
	3.418	-.006	5.974	.113	-.178	.016	-.319	.061
	.097	.102	.393	.999	.274	.498	.366	.072
	868.259	-1.447	1517.365	28.729	-45.129	4.000	-81.082	15.565
FLY	.283	-.073	-.017	-.038	1.000	-.054	-.050	-.038
	492.360	-.216	-248.480	-.178	194.437	-104.266	-30.965	-1.058
	.000	.122	.393	.274	.999	.195	.212	.272
	125059.341	-54.953	-63113.898	-45.129	49386.996	-26483.667	-7865.184	-268.831
SATE	.033	-.184	.802	.000	-.054	1.000	.242	-.183
	568.894	-5.409	115948.604	.016	-104.266	19151.349	1478.526	-50.332
	.300	.002	.000	.498	.195	.999	.000	.002
	144499.000	-1374.000	29450945.333	4.000	-26483.667	4864442.667	375545.667	-12784.333
GPA	-.032	.001	.499	-.022	-.050	.242	1.000	-.093
	-176.256	.009	23013.905	-.319	-30.965	1478.526	1947.678	-8.146
	.305	.494	.000	.366	.212	.000	.999	.069
	-44768.965	2.212	5845531.792	-81.082	-7865.184	375545.667	494710.337	-2069.075
M	-.031	.000	-.154	.092	-.038	-.183	-.093	1.000
	-7.668	.000	-319.498	.061	-1.058	-50.332	-8.146	3.936
	.311	.499	.007	.072	.272	.002	.069	.999
	-1947.671	-.024	-81152.384	15.565	-268.831	-12784.333	-2069.075	999.749
AA	.020	-.149	.818	-.004	-.029	.796	.191	-.153
	48.275	-.621	16723.823	-.024	-7.971	2155.923	164.942	-5.949
	.377	.008	.000	.477	.321	.000	.001	.007
	12261.729	-157.624	4247851.149	-6.035	-2024.698	547604.333	41895.192	-1510.984

**** MULTIPLE REGRESSION ****

	PERF	SEX	GIS	A	FLY	SATE	GPA	M
PL	.229	-.139	.407	-.020	.182	.396	.059	-.124
	402.153	-.414	5987.832	-.093	35.784	771.382	36.520	-3.467
	.000	.013	.000	.378	.002	.000	.175	.024
	102146.788	-105.271	1520909.247	-23.506	9089.106	195931.000	9275.976	-880.553
NV	.206	-.104	.580	.105	.021	.547	.158	-.057
	399.323	-.343	9427.665	.550	4.522	1178.524	108.661	-1.771
	.000	.049	.000	.047	.370	.000	.006	.181
	101427.988	-87.071	2394626.847	139.694	1148.506	299345.000	27599.776	-449.753
VB	-.027	-.176	.692	-.073	.019	.689	.126	-.228
	-71.815	-.791	15320.390	-.522	5.616	2020.854	117.820	-9.603
	.333	.002	.000	.122	.381	.000	.022	.000
	-18240.988	-200.929	3891379.153	-132.694	1426.494	513297.000	29926.224	-2439.247
OT	.077	-.107	.677	.083	-.049	.641	.211	-.014
	187.928	-.446	13881.431	.548	-13.276	1740.794	182.844	-.558
	.111	.044	.000	.093	.220	.000	.000	.410
	47733.776	-113.341	3525883.427	139.188	-3372.055	442161.667	46442.420	-141.639

*** * * * M U L T I P L E   R E G R E S S I O N * * * ***

	AA	PL	NV	VB	QT
PERF	.020	.229	.206	-.027	.077
	48.275	402.153	399.323	-71.815	187.928
	.377	.000	.000	.333	.111
	12261.729	102146.788	101427.988	-18240.988	47733.776
SEX	-.149	-.139	-.104	-.176	-.107
	-.621	-.414	-.343	-.791	-.446
	.008	.013	.049	.002	.044
	-157.624	-105.271	-87.071	-200.929	-113.341
GIS	.818	.407	.580	.692	.677
	16723.823	5987.832	9427.665	15320.390	13881.431
	.000	.000	.000	.000	.000
	4247851.149	1520909.247	2394626.847	3891379.153	3525883.427
A	-.004	-.020	.105	-.073	.083
	-.024	-.093	.550	-.522	.548
	.477	.378	.047	.122	.093
	-6.035	-23.506	139.694	-132.694	139.188
FLY	-.029	.182	.021	.019	-.049
	-7.971	35.784	4.522	5.616	-13.276
	.321	.002	.370	.381	.220
	-2024.638	9089.106	1148.506	1426.494	-3372.055
SATE	.796	.396	.547	.689	.641
	2155.923	771.382	1178.524	2020.854	1740.794
	.000	.000	.000	.000	.000
	547604.333	195931.000	299345.000	513297.000	442161.667
GPA	.191	.059	.158	.126	.211
	164.942	36.520	108.661	117.820	182.844
	.001	.175	.006	.022	.000
	41895.192	9275.976	27599.776	29926.224	46442.420
M	-.153	-.124	-.057	-.228	-.014
	-5.949	-3.467	-1.771	-9.603	-.558
	.007	.024	.181	.000	.410
	-1510.984	-880.553	-449.753	-2439.247	-141.639
AA	1.000	.469	.660	.847	.802
	383.046	129.082	201.146	351.102	308.072
	.999	.000	.000	.000	.000
	97293.749	32786.847	51091.047	89179.953	78250.227

*** * * * M U L T I P L E   R E G R E S S I O N * * * ***

	AA	PL	NV	VB	QT
PL	.469	1.000	.804	.352	.429
	129.082	198.001	176.108	104.821	118.411
	.000	.999	.000	.000	.000
	32786.847	50292.141	44731.341	26624.659	30076.482
NV	.660	.804	1.000	.340	.775
	201.146	176.108	242.322	112.284	236.878
	.000	.000	.999	.000	.000
	51091.047	44731.341	61549.741	28520.259	60167.082
VB	.847	.352	.340	1.000	.375
	351.102	104.821	112.284	448.975	155.823
	.000	.000	.000	.999	.000
	89179.953	26624.659	28520.259	114039.741	39578.918
QT	.802	.429	.775	.375	1.000
	308.072	118.411	236.878	155.823	385.312
	.000	.000	.000	.000	.999
	78250.227	30076.482	60167.082	39578.918	97869.231

**** M U L T I P L E   R E G R E S S I O N ****

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

DESCRIPTIVE STATISTICS ARE PRINTED ON PAGE 163

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1..   FLY

MULTIPLE R	.28302		
R SQUARE	.08010	R SQUARE CHANGE	.08010
ADJUSTED R SQUARE	.07647	F CHANGE	22.03069
STANDARD ERROR	119.89353	SIGNIF F CHANGE	.0000

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	316679.28923	316679.28923
RESIDUAL	253	3636738.02841	14374.45861

F = 22.03069   SIGNIF F = .0000

CONDITION NUMBER BOUNDS: 1.000,   1.000

VAR-COVAR MATRIX OF REGRESSION COEFFICIENTS (B)
BELOW DIAGONAL: COVARIANCE   ABOVE: CORRELATION

	FLY
FLY	.29106

XTX MATRIX

	FLY	PERF	SEX	GIS	A	SATF	GPA	M	AA	PL
FLY	1.00000	-.28302	.07312	.01705	.03789	.05403	.05032	.03826	.02921	-.18237
PERF	.28302	.91990	.03243	.06367	.09219	.04824	-.01777	-.02015	.02804	.17746
SEX	-.07312	.03243	.99465	-.24550	-.08261	-.18818	-.00275	-.00302	-.15157	-.12548
GIS	-.01706	.06367	-.24550	.99971	.01636	.80125	.49841	-.15484	.81762	.41053
A	-.03789	.09219	-.08261	.01636	.99856	-.00171	-.02341	.09039	-.00472	-.01265
SATE	-.05403	.04824	-.18818	.80125	-.00171	.99708	.23937	-.18539	.79441	.40598
GPA	-.05032	-.01777	-.00275	.49841	-.02341	.23937	.99747	-.09496	.18949	.06798
M	-.03826	-.02015	-.00302	-.15484	.09039	-.18539	-.09496	.99854	-.15432	-.11720
AA	-.02921	.02804	-.15157	.81762	-.00472	.79441	.18949	-.15432	.99915	.47404
PL	.18237	.17746	-.12548	.41053	-.01265	.40598	.06798	-.11720	.47404	.96674
NV	.02083	.19972	-.10226	.58020	.10584	.54819	.15922	-.05654	.66083	.80019
VB	.01901	-.03255	-.17456	.69257	-.07259	.69019	.12695	-.22772	.84719	.34810
QT	-.04850	.09047	-.11068	.67624	.08117	.63821	.20862	-.01617	.80048	.43755

**** MULTIPLE REGRESSION ****

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

XTX MATRIX

	NV	VB	QT
FLY	-.02083	-.01901	.04850
PERF	.19972	-.03255	.09047
SEX	-.10226	-.17456	-.11068
GIS	.58020	.69257	.67624
A	.10584	-.07259	.08117
SATE	.54819	.69019	.63821
GPA	.15922	.12695	.20862
M	-.05654	-.22772	-.01617
AA	.66083	.84719	.80048
PL	.80019	.34810	.43755
NV	.99957	.34002	.77623
VB	.34002	.99964	.37556
QT	.77623	.37556	.99765

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	95% CONFDNCE INTPVL B		BETA	SE BETA	CORREL	PART COR	PARTIAL	TOLERANCE	T
FLY	2.532232	.539498	1.469754	3.594710	.283024	.060299	.283024	.283024	.283024	1.000000	4.694
(CONSTANT)	714.079190	8.487614	697.363811	730.794570							84.132

IN

VARIABLE	SIG T
FLY	.0000
(CONSTANT)	.0000

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	MIN TOLER	T	SIG T
SEX	.032606	.033905	.994653	.994653	.539	.5907
GIS	.063686	.066391	.999709	.999709	1.056	.2919
A	.092326	.096193	.998565	.998565	1.534	.1263
SATE	.048384	.050373	.997080	.997080	.801	.4241
GPA	-.017816	-.018552	.997468	.997468	-.295	.7686
M	-.020182	-.021027	.998536	.998536	-.334	.7388
AA	.028061	.029245	.999147	.999147	.464	.6427
PL	.183570	.188186	.966739	.966739	3.042	.0026
NV	.199808	.208280	.999566	.999566	3.380	.0008
VB	-.032558	-.033940	.999639	.999639	-.539	.5903
QT	.090680	.094434	.997647	.997647	1.506	.1334

**** MULTIPLE REGRESSION ****

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

VARIABLE(S) ENTERED ON STEP NUMBER 2..   NV

MULTIPLE R	.34642		
R SQUARE	.12001	R SQUARE CHANGE	.03991
ADJUSTED R SQUARE	.11302	F CHANGE	11.42767
STANDARD ERROR	117.49660	SIGNIF F CHANGE	.0008

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	2	474443.49279	237221.74639
RESIDUAL	252	3478973.82486	13805.45169

F = 17.18319   SIGNIF F = .0000

CONDITION NUMBER BOUNDS: 1.000,   4.002

VAR-COVAR MATRIX OF REGRESSION COEFFICIENTS (B)
BELOW DIAGONAL: COVARIANCE   ABOVE: CORRELATION

	FLY	NV
FLY	.27966	-.02083
NV	-.00522	.22439

XTX MATRIX

	FLY	NV	PERF	SEX	GIS	A	SATE	GPA	M	AA
FLY	1.00043	-.02084	-.27886	.07099	.02915	.04009	.06546	.05364	.03708	.04298
NV	-.02084	1.00043	-.19981	.10231	-.58045	-.10589	-.54843	-.15928	.05656	-.66112
PERF	.27886	.19981	.87999	.05286	-.05226	.07105	-.06129	-.04958	-.00886	-.10400
SEX	-.07099	-.10231	.05286	.98419	-.18614	-.07178	-.13209	.01354	-.00880	-.08396
GIS	-.02915	.58045	-.05226	-.18614	.66293	-.04508	.48305	.40599	-.12202	.43404
A	-.04009	.10589	.07105	-.07178	-.04508	.98736	-.05976	-.04027	.09638	-.07469
SATE	-.06546	.54843	-.06129	-.13209	.48305	-.05976	.69643	.15205	-.15438	.43199
GPA	-.05364	.15928	-.04958	.01354	.40599	-.04027	.15205	.97211	-.08596	.08423
M	-.03708	-.05656	-.00886	-.00880	-.12202	.09638	-.15438	-.08596	.99534	-.11694
AA	-.04298	.66112	-.10400	-.08396	.43404	-.07469	.43199	.08423	-.11694	.56226
PL	.16570	.80053	.01758	-.04361	-.05394	-.09737	-.03287	-.05947	-.07194	-.05498
VB	.01192	.34017	-.10049	-.13977	.49521	-.10859	.50371	.07279	-.20849	.62240
QT	-.06468	.77656	-.06463	-.03127	.22568	-.00102	.21250	.08498	.02773	.28731

**** MULTIPLE REGRESSION ****

EQUATION NUMBER 1 DEPENDENT VARIABLE.. PERF
XTX MATRIX

	PL	VB	QT
FLY	-.16570	-.01192	.06468
NV	-.80053	-.34017	-.77656
PERF	.01758	-.10049	-.06463
SEX	-.04361	-.13977	-.03127
GIS	-.05394	.49521	.22568
A	-.09737	-.10859	-.00102
SATE	-.03287	.50371	.21250
GPA	-.05947	.07279	.08498
M	-.07194	-.20849	.02773
AA	-.05498	.62240	.28731
PL	.32616	.07590	-.18385
VB	.07590	.88397	.11151
QT	-.18385	.11151	.39486

-- VARIABLES IN THE EQUATION --

VARIABLE	B	SE B	95% CONFDNCE INTRVL B		BETA	SE BETA	CORREL	PART COR	PARTIAL	TOLERANCE	T
FLY	2.494993	.528827	1.453510	3.536475	.278862	.059106	.283024	.278801	.284889	.999566	4.718
NV	1.601347	.473703	.668425	2.534269	.199808	.059106	.205617	.199764	.208280	.999566	3.380
(CONSTANT)	603.068252	33.875841	536.352412	669.784092							17.802

------ IN -------

VARIABLE	SIG T
FLY	.0000
NV	.0008
(CONSTANT)	.0000

---------------- VARIABLES NOT IN THE EQUATION ----------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	MIN TOLER	T	SIG T
SEX	.053713	.056804	.984191	.984191	.901	.3682
GIS	-.078833	-.068423	.662931	.662836	-1.087	.2783
A	.071955	.076218	.987357	.987357	1.211	.2270
SATE	-.088006	-.078292	.696432	.696432	-1.244	.2146
GPA	-.051006	-.053609	.972107	.972107	-.851	.3958
M	-.008897	-.009462	.995338	.995338	-.150	.8810
AA	-.184969	-.147853	.562262	.562262	-2.368	.0186
PL	.053901	.032815	.326162	.326162	.520	.6034
VB	-.113674	-.113931	.883974	.883909	-1.817	.0704
QT	-.163678	-.109641	.394858	.394858	-1.748	.0818

**** MULTIPLE REGRESSION ****

EQUATION NUMBER 1 DEPENDENT VARIABLE.. PERF

VARIABLE(S) ENTERED ON STEP NUMBER 3.. AA

MULTIPLE R	.37316			ANALYSIS OF VARIANCE				
R SQUARE	.13925	R SQUARE CHANGE	.01924		DF	SUM OF SQUARES	MEAN SQUARE	
ADJUSTED R SQUARE	.12896	F CHANGE	5.60961	REGRESSION	3	550495.59114	183498.53038	
STANDARD ERROR	116.43649	SIGNIF F CHANGE	.0186	RESIDUAL	251	3402921.72651	13557.45708	

F = 13.53488 SIGNIF F = .0000

CONDITION NUMBER BOUNDS: 1.779, 13.680

VAR-COVAR MATRIX OF REGRESSION COEFFICIENTS (B)
BELOW DIAGONAL: COVARIANCE ABOVE: CORRELATION

	FLY	NV	AA
FLY	.27554	-.05343	.05721
NV	-.01755	.39159	-.66125
AA	.01495	-.20600	.24783

XTX MATRIX

	FLY	NV	AA	PERF	SEX	GIS	A	SATE	GPA	M
FLY	1.00372	-.07138	.07644	-.27091	.07741	-.00403	.04580	.03243	.04720	.04602
NV	-.07138	1.77778	-1.17582	-.32209	.00358	-.07011	-.19371	-.04049	-.06024	-.08094
AA	.07644	-1.17582	1.77853	.18497	.14933	-.77195	.13284	-.76831	-.14981	.20799
PERF	.27091	.32209	-.18497	.86075	.03733	.02802	.05723	.01861	-.03400	-.03049
SEX	-.07741	-.00358	-.14933	.03733	.97165	-.12133	-.08293	-.06758	.02612	-.02627
GIS	.00403	.07011	.77195	.02802	-.12133	.32788	.01258	.14958	.34097	-.03175
A	-.04580	.19371	-.13284	.05723	-.08293	.01258	.97744	-.00237	-.02908	.08084
SATE	-.03243	.04049	.76831	.01861	-.06758	.14958	-.00237	.36453	.08733	-.06453
GPA	-.04720	.06024	.14981	-.03400	.02612	.34097	-.02908	.08733	.95949	-.06844
M	-.04602	.08094	-.20799	-.03049	-.02627	-.03175	.08084	-.06453	-.06844	.97102
PL	.16150	.86518	-.09778	.00741	-.05182	-.01150	-.10468	.00937	-.05124	-.08338
VB	.05950	-.39165	1.10695	.01464	-.04683	.01475	-.02592	.02552	-.02045	-.07903
QT	-.04272	.43874	.51098	-.01149	.01163	.00389	.03714	-.00824	.04194	.08749

**** MULTIPLE REGRESSION ****

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

XTX MATRIX

	PL	VB	QT
FLY	-.16150	-.05950	.04272
NV	-.86518	.39165	-.43874
AA	.09778	-1.10695	-.51098
PERF	.00741	.01464	-.01149
SEX	-.05182	-.04683	.01163
GIS	-.01150	.01475	.00389
A	-.10468	-.02592	.03714
SATE	.00937	.02552	-.00824
GPA	-.05124	-.02045	.04194
M	-.08338	-.07903	.08749
PL	.32079	.13676	-.15576
VB	.13676	.19501	-.20652
QT	-.15576	-.20652	.24805

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	SE B	95% CONFDNCE INTRVL B		BETA	SE BETA	CORREL	PART COR	PARTIAL	TOLERANCE	T
FLY	2.423863	.524915	1.390063	3.457662	.270912	.058669	.283024	.270409	.279819	.996294	4.618
NV	2.581403	.625771	1.348971	3.813834	.322094	.078080	.205617	.241570	.251976	.562498	4.125
AA	-1.179081	.497826	-2.159529	-.198633	-.184969	.078097	.019771	-.138698	-.147853	.562262	-2.368
(CONSTANT)	610.980219	33.735996	544.538515	677.421922							18.111

------ IN -------

VARIABLE	SIG T
FLY	.0000
NV	.0001
AA	.0186
(CONSTANT)	.0000

------------ VARIABLES NOT IN THE EQUATION ------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	MIN TOLER	T	SIG T
SEX	.038422	.040822	.971652	.555099	.646	.5189
GIS	.085465	.052748	.327879	.278089	.835	.4044
A	.058551	.062394	.977436	.550608	.988	.3239
SATE	.051065	.033232	.364529	.294301	.526	.5995
GPA	-.035439	-.037416	.959489	.554963	-.592	.5544
M	-.031397	-.033347	.971015	.548522	-.528	.5983
PL	.023104	.014105	.320786	.243237	.223	.8237
VB	.075069	.035731	.195010	.124038	.565	.5724
QT	-.046307	-.024859	.248049	.248049	-.393	.6945

END BLOCK NUMBER 1 PIN = .050 LIMITS REACHED.

* * * * M U L T I P L E R E G R E S S I O N * * * *

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

SUMMARY TABLE

STEP	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH	FCH	SIGCH		VARIABLE	BETAIN	CORREL
1	.2830	.0801	.0765	22.031	.000	.0801	22.031	.000	IN:	FLY	.2830	.2830
2	.3464	.1200	.1130	17.183	.000	.0399	11.428	.001	IN:	NV	.1998	.2056
3	.3732	.1392	.1290	13.535	.000	.0192	5.610	.019	IN:	AA	-.1850	.0198

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                    * * * *   M U L T I P L E   R E G R E S S I O N   * * * *

EQUATION NUMBER 1    DEPENDENT VARIABLE..   PERF

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

           -3.0      0.0       3.0
 CASE #    O:........:........:O  PERF      *PRED     *RESID   *SRESID  *SDRESID    *LEVER    *MAHAL   *COOK D
      1     .        *        .    664   664.6866    -.6866    -.0060    -.0060     .0193    4.9067     .0000
      2     .        *        .    704   689.1612   14.8388     .1281     .1278     .0057    1.4355     .0000
      3     .        .*       .    775   733.9380   41.0620     .3545     .3538     .0062    1.5816     .0003
      4     .      * .        .    630   706.2406  -76.2406    -.6579    -.6571     .0054    1.3765     .0010
      5     .*       .        .    336   683.6148 -347.6148   -2.9990   -3.0481     .0051    1.2881     .0204
      6     *        .        .    341   721.2196 -380.2196   -3.2773   -3.3431     .0033     .8412     .0196
      7     .        .*       .    746   726.4799   19.5201     .1682     .1679     .0027     .6954     .0000
      8     .        .  *     .    831   733.9380   97.0620     .8379     .8374     .0062    1.5816     .0018
      9     .        .   *    .    939   772.1476  166.8524    1.4509    1.4541     .0206    5.2352     .0132
     10     .        .  *     .    832   724.2376  107.7624     .9299     .9297     .0055    1.4094     .0021
     11     .        . *      .    797   708.1240   88.8760     .7669     .7663     .0055    1.3864     .0014
     12     .        .        .      0   746.1124       .         .         .       .0105    2.6679       .
     13     .        *        .    685   683.9984    1.0016     .0086     .0086     .0070    1.7718     .0000
     14     .       *.        .    690   718.0660  -28.0660    -.2417    -.2412     .0014     .3447     .0001
     15     .        .   *    .    915   750.9545  164.0455    1.4167    1.4196     .0071    1.7980     .0056
     16     . *      .        .    410   703.7305 -293.7305   -2.5310   -2.5588     .0028     .6671     .0106
     17     .       *.        .    717   742.0658  -25.0658    -.2174    -.2170     .0155    3.9397     .0002
     18     .        . *      .    750   687.0892   62.9108     .5426     .5419     .0047    1.1862     .0006
     19     .        . *      .    818   735.7868   82.2132     .7106     .7099     .0086    2.1961     .0016
     20     .        .   *    .    913   758.4755  154.5245    1.3364    1.3385     .0100    2.5346     .0063
     21     .       *.        .    672   725.1405  -53.1405    -.4577    -.4569     .0017     .4221     .0003
     22     .       *.        .    753   794.8334  -41.8334    -.3617    -.3611     .0094    2.3814     .0004
     23     .        .  *     .    849   729.5361  119.4639    1.0349    1.0350     .0131    3.3303     .0046
     24     .        .*       .    799   754.5264   44.4736     .3858     .3852     .0161    4.0800     .0008
     25     .        .*       .    713   686.2591   26.7409     .2308     .2304     .0060    1.5159     .0001
     26     .        *        .    743   740.9023    2.0977     .0181     .0180     .0003     .0806     .0000
     27     .        .*       .    836   781.8395   54.1605     .4695     .4687     .0144    3.6635     .0010
     28     .        .   *    .    871   722.9427  148.0573    1.2761    1.2777     .0032     .8103     .0029
     29     .        .*       .    670   646.5010   23.4990     .2057     .2053     .0333    8.4627     .0004
     30     .        .  *     .    990   858.7023  131.2977    1.1539    1.1547     .0412   10.4537     .0157
     31     .        . *      .    816   719.3765   96.6235     .8320     .8315     .0012     .3049     .0009
     32     .        *        .    830   839.1242   -9.1242    -.0800    -.0798     .0364    9.2348     .0001
     33     .      * .        .    689   750.6451  -61.6451    -.5328    -.5320     .0087    2.2011     .0009
     34     .        .*       .    766   723.7036   42.2964     .3670     .3664     .0186    4.2110     .0007
     35     .      * .        .    667   762.1759  -95.1759    -.8242    -.8237     .0125    3.1672     .0028
     36     .        .   *    .    898   751.6115  146.3885    1.2624    1.2639     .0042    1.0727     .0033
     37     .        .  *     .    813   695.9150  117.0850    1.0107    1.0108     .0063    1.5894     .0026
     38     .  *     .        .    410   697.0941 -287.0941   -2.4786   -2.5045     .0065    1.6568     .0162
     39     .     *  .        .    565   662.1052  -97.1052    -.8444    -.8439     .0205    5.2188     .0045
     40     .        .    *   .    924   715.5503  208.4497    1.7949    1.8030     .0013     .3298     .0042
 CASE #    O:........:........:O  PERF      *PRED     *RESID   *SRESID  *SDRESID    *LEVER    *MAHAL   *COOK D
           -3.0      0.0       3.0
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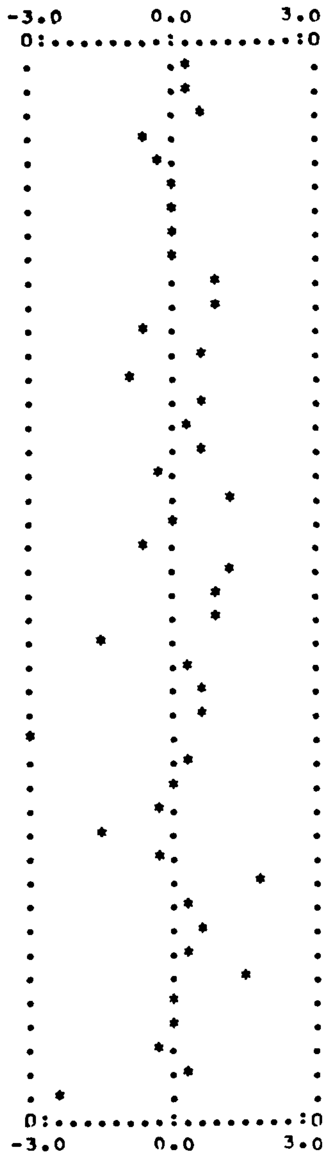
CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING



CASE #	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D
41	658	634.7914	23.2086	.2026	.2022	.0282	7.1613	.0003
42	825	802.0132	22.9868	.1987	.1984	.0093	2.3638	.0001
43	800	729.3637	70.6363	.6099	.6092	.0068	1.7330	.0010
44	645	710.6708	-65.6708	-.5661	-.5653	.0035	.8916	.0006
45	720	746.5589	-26.5589	-.2300	-.2296	.0128	3.2479	.0002
46	777	763.2893	13.7107	.1188	.1185	.0132	3.3556	.0001
47	750	735.0592	14.9408	.1298	.1295	.0183	4.6462	.0001
48	720	702.5430	17.4570	.1510	.1507	.0107	2.7219	.0001
49	728	731.8293	-3.8293	-.0330	-.0330	.0046	1.1627	.0000
50	827	703.5073	123.4927	1.0639	1.0642	.0023	.5904	.0018
51	852	744.4240	107.5760	.9326	.9324	.0147	3.7262	.0041
52	654	716.7266	-62.7266	-.5402	-.5395	.0017	.4346	.0004
53	822	740.1591	81.8409	.7051	.7044	.0025	.6338	.0008
54	661	762.2148	-101.2148	-.8772	-.8768	.0142	3.6006	.0035
55	750	680.8102	69.1898	.5972	.5964	.0059	1.5009	.0009
56	734	678.1313	55.8687	.4842	.4834	.0140	3.5627	.0011
57	778	703.2918	74.7082	.6445	.6438	.0051	1.2982	.0009
58	657	701.1753	-44.1753	-.3805	-.3799	.0020	.5145	.0002
59	821	664.8152	156.1848	1.3549	1.3571	.0159	4.0333	.0093
60	708	720.2009	-12.2009	-.1051	-.1049	.0013	.3177	.0000
61	682	772.4747	-90.4747	-.7866	-.7860	.0203	5.1520	.0038
62	851	705.5080	145.4920	1.2543	1.2557	.0037	.9285	.0030
63	815	696.2357	118.7643	1.0235	1.0236	.0030	.7523	.0018
64	799	682.2181	116.7819	1.0114	1.0114	.0127	3.2167	.0043
65	499	706.7295	-207.7295	-1.7894	-1.7973	.0020	.5135	.0048
66	680	622.5541	57.4459	.5041	.5034	.0383	9.7255	.0028
67	857	766.0735	90.9265	.7987	.7981	.0402	10.1998	.0074
68	825	734.2241	90.7759	.7826	.7820	.0037	.9404	.0012
69	348	780.0197	-432.0197	-3.7549	-3.8574	.0197	5.0005	.0852
70	736	699.3893	36.6107	.3156	.3150	.0033	.8458	.0002
71	707	718.2921	-11.2921	-.0974	-.0972	.0048	1.2252	.0000
72	659	711.5984	-52.5984	-.4547	-.4540	.0092	2.3378	.0007
73	445	628.5124	-183.5124	-1.6057	-1.6108	.0327	8.2960	.0245
74	706	750.3823	-44.3823	-.3836	-.3830	.0088	2.2252	.0005
75	931	699.1661	231.8339	1.9989	2.0110	.0039	.9815	.0078
76	819	773.5174	45.4826	.3949	.3942	.0176	4.4805	.0009
77	789	692.6010	96.3990	.8316	.8311	.0050	1.2776	.0016
78	751	725.7127	25.2873	.2183	.2178	.0059	1.5042	.0001
79	995	804.4342	190.5658	1.6505	1.6562	.0128	3.2556	.0116
80	786	770.1745	15.8255	.1372	.1369	.0141	3.5749	.0001
81	750	749.2477	.7523	.0065	.0065	.0013	.3427	.0000
82	702	748.1499	-46.1499	-.3984	-.3977	.0064	1.6290	.0004
83	781	731.7819	49.2181	.4235	.4228	.0000	.0035	.0002
84	377	701.9707	-324.9707	-2.8008	-2.8399	.0031	.7822	.0138
CASE #	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED M: MISSING

CASE #	-3.0 0.0 3.0	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D
85	. * . .	515	704.0590	-189.0590	-1.6336	-1.6391	.0082	2.0838	.0082
86	. .* .	799	757.4596	41.5404	.3582	.3575	.0038	.9764	.0003
87	. * .	778	782.5968	-4.5968	-.0400	-.0399	.0217	5.5117	.0000
88	. .* .	765	729.4160	35.5840	.3068	.3062	.0037	.9379	.0002
89	. * .	725	741.6193	-16.6193	-.1439	-.1437	.0129	3.2698	.0001
90	. . * .	903	748.8147	154.1853	1.3276	1.3297	.0013	.3196	.0023
91	. .* .	821	767.6220	53.3780	.4625	.4618	.0138	3.4968	.0010
92	. .* .	784	733.6886	50.3114	.4342	.4335	.0056	1.4099	.0005
93	. . * .	837	737.0076	99.9924	.8612	.8608	.0017	.4393	.0011
94	. . .	0	768.3546	.	.	.	.0147	3.7482	.
95	. . * .	804	676.5742	127.4258	1.1023	1.1028	.0104	2.6404	.0044
96	. * .	683	664.0798	18.9202	.1639	.1636	.0129	3.2783	.0001
97	. . * .	840	764.0608	75.9392	.6607	.6599	.0216	5.4919	.0029
98	. . * .	826	696.0753	129.9247	1.1196	1.1202	.0029	.7241	.0021
99	. *. .	678	718.6382	-40.6382	-.3503	-.3496	.0031	.7944	.0002
100	. . * .	761	651.1728	109.8272	.9544	.9542	.0194	4.9166	.0054
101	. . * .	837	746.3802	90.6198	.7874	.7868	.0192	4.8695	.0037
102	. . * .	832	772.2543	59.7457	.5174	.5166	.0125	3.1853	.0011
103	. . * .	823	704.2660	118.7340	1.0225	1.0226	.0016	.3994	.0014
104	. * . .	683	771.0335	-88.0335	-.7595	-.7589	.0052	1.3193	.0013
105	. * .	740	739.3241	.6759	.0058	.0058	.0079	2.0064	.0000
106	. * .	792	779.7837	12.2163	.1056	.1054	.0092	2.3325	.0000
107	. * .	768	763.5754	4.4246	.0383	.0382	.0117	2.9803	.0000
108	. * . .	437	681.4933	-244.4933	-2.1179	-2.1328	.0131	3.3223	.0194
109	. * .	734	739.8963	-5.8963	-.0508	-.0507	.0040	1.0090	.0000
110	. * .	702	704.8383	-2.8383	-.0245	-.0244	.0059	1.4983	.0000
111	. .* .	774	732.3782	41.6218	.3591	.3585	.0051	1.2909	.0003
112	. . * .	787	694.7359	92.2641	.7964	.7958	.0060	1.5312	.0016
113	. .* .	800	779.5004	20.4996	.1775	.1771	.0119	3.0105	.0001
114	. .* .	793	739.8963	53.1037	.4579	.4572	.0040	1.0090	.0004
115	. .* .	769	745.0591	23.9409	.2066	.2062	.0052	1.3244	.0001
116	. . .	0	728.4891	.	.	.	.0097	2.4848	.
117	. * .	740	733.1708	6.8292	.0589	.0588	.0041	1.0386	.0000
118	. * . .	532	680.0147	-148.0147	-1.2788	-1.2804	.0079	1.9989	.0049
119	. * . .	433	681.8006	-248.8006	-2.1566	-2.1725	.0144	3.6463	.0216
120	. . * .	962	739.2612	222.7388	1.9300	1.9406	.0137	3.4770	.0167
121	. .* .	748	718.2892	29.7108	.2559	.2554	.0016	.4031	.0001
122	. . * .	783	724.3450	58.6550	.5056	.5049	.0038	.9033	.0005
123	. * .	730	738.7172	-8.7172	-.0752	-.0750	.0038	.9576	.0000
124	. *. .	783	818.2745	-35.2745	-.3082	-.3076	.0296	7.5260	.0008
125	. .* .	708	685.1853	22.8147	.1971	.1967	.0075	1.9150	.0001
126	. . * .	808	716.5379	91.4621	.7902	.7896	.0079	2.0033	.0019
127	. * .	735	754.3314	-19.3314	-.1674	-.1671	.0123	3.1310	.0001
128	. * . .	370	689.3845	-319.3845	-2.7570	-2.7941	.0062	1.5759	.0194
CASE #	O:........:........:O -3.0 0.0 3.0	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

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           -3.0      0.0      3.0
  CASE #    0:........:........:0   PERF      *PRED      *RESID   *SRESID  *SDRESID   *LEVER    *MAHAL   *COOK D
     129    .         .         .      0   709.6521          .         .         .    .0012     .2993         .
     130    .        *.         .    728   753.9697    -25.9697   -.2239    -.2235    .0037     .9445     .0001
     131    .         .  *      .    854   730.9730    123.0270   1.0600    1.0602    .0024     .6177     .0018
     132    .         .         .      0   717.0473          .         .         .    .0048    1.1775         .
     133    .         .  *      .    851   753.8906     97.1094    .8402     .8397    .0108    2.7407     .0026
     134    .         .*        .    734   710.3903     23.6097    .2037     .2033    .0052    1.3319     .0001
     135    .         *         .    751   736.5844     14.4156    .1249     .1247    .0136    3.4569     .0001
     136    .        *.         .    686   738.1104    -52.1104   -.4497    -.4490    .0056    1.4321     .0005
     137    .         .*        .    813   773.9512     39.0488    .3370     .3364    .0060    1.5249     .0003
     138    .         *         .    682   683.8409     -1.8409   -.0159    -.0159    .0075    1.9031     .0000
     139    .         .   *     .    995   828.8198    166.1802   1.4452    1.4484    .0208    5.2932     .0133
     140    .      *  .         .    701   826.8488   -125.8488  -1.1206   -1.1211    .0657   16.6987     .0235
     141    .         .*        .    770   728.5174     41.4826    .3580     .3573    .0055    1.4005     .0003
     142    .         . *       .    817   745.6659     71.3341    .6166     .6158    .0089    2.2494     .0012
     143    .       * .         .    625   703.1053    -78.1053   -.6755    -.6748    .0101    2.5642     .0016
     144    .         . *       .    847   758.9721     88.0279    .7582     .7576    .0019     .4707     .0008
     145    .         .  *      .    851   736.3591    114.6409    .9882     .9882    .0035     .8826     .0018
     146    .         *         .    761   779.6580    -18.6580   -.1614    -.1611    .0107    2.7166     .0001
     147    .         . *       .    831   738.7886     92.2114    .7983     .7977    .0120    3.0455     .0026
     148    .         .*        .    754   729.1588     24.8412    .2153     .2149    .0138    3.5040     .0002
     149    .         .*        .    881   855.9443     25.0557    .2210     .2205    .0477   12.1133     .0007
     150    .  *      .         .    466   721.7007   -255.7007  -2.2092   -2.2265    .0079    2.0084     .0146
     151    .         .         .      0   650.9495          .         .         .    .0185    4.7298         .
     152    .         *         .    713   721.5687     -8.5687   -.0742    -.0741    .0133    3.3791     .0000
     153    .         .*        .    733   677.1754     55.8246    .4835     .4827    .0127    3.2297     .0010
     154    .        *.         .    689   744.2007    -55.2007   -.4782    -.4775    .0134    3.4025     .0010
     155    .        *.         .    670   710.1960    -40.1960   -.3474    -.3468    .0087    2.2175     .0004
     156    .       * .         .    808   871.3395    -63.3395   -.5641    -.5633    .0661   16.7953     .0060
     157    .         *         .    735   721.0310     13.9690    .1205     .1203    .0051    1.3006     .0000
     158    .    *    .         .    466   678.1030   -212.1030  -1.8349   -1.8437    .0105    2.6737     .0123
     159    .         .   *     .    898   760.7079    137.2921   1.1887    1.1897    .0122    3.1002     .0058
     160    .         .  *      .    814   698.6913    115.3087    .9977     .9977    .0108    2.7324     .0037
     161    .    *    .         .    554   756.3406   -202.3406  -1.7489   -1.7562    .0088    2.2333     .0098
     162    .    *    .         .    505   711.3744   -206.3744  -1.7844   -1.7922    .0094    2.3891     .0108
     163    .         . *       .    839   766.8739     72.1261    .6259     .6251    .0165    4.1857     .0020
     164    .  *      .         .    390   661.7845   -271.7845  -2.3540   -2.3756    .0128    3.2541     .0236
     165    .         *         .    693   710.9915    -17.9915   -.1550    -.1547    .0024     .6017     .0000
     166    .         .   *     .    854   700.0245    153.9755   1.3377    1.3398    .0189    4.7894     .0104
     167    .       * .         .    653   721.5114    -68.5114   -.5898    -.5890    .0007     .1864     .0004
     168    .       * .         .    664   734.2241    -70.2241   -.6054    -.6047    .0037     .9404     .0007
     169    .         *         .    775   775.0801      -.0801   -.0007    -.0007    .0171    4.3312     .0000
     170    .         . *       .    748   668.4125     79.5875    .6886     .6879    .0108    2.7538     .0018
     171    .     *   .         .    676   828.1084   -152.1084  -1.3222   -1.3242    .0200    5.0695     .0107
     172    .        *.         .    845   889.4750    -44.4750   -.3970    -.3964    .0708   17.9326     .0032
  CASE #    0:........:........:0   PERF      *PRED      *RESID   *SRESID  *SDRESID   *LEVER    *MAHAL   *COOK D
           -3.0      0.0      3.0
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CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

CASE #	-3.0 0:........:........:0 3.0	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D
173	. *. .	622	674.9459	-52.9459	-.4597	-.4590	.0177	4.5064	.0012
174	. * .	765	759.2321	5.7679	.0497	.0496	.0013	.3352	.0000
175	. . * .	790	703.5384	86.4616	.7474	.7467	.0089	2.2611	.0018
176	. . * .	840	753.5437	86.4563	.7466	.7459	.0070	1.7767	.0015
177	. * .	757	745.4427	11.5573	.0999	.0997	.0081	2.0521	.0000
178	. * .	793	797.9193	-4.9193	-.0426	-.0425	.0121	3.0706	.0000
179	. . * .	849	713.5383	135.4617	1.1699	1.1708	.0072	1.8398	.0039
180	. * .	798	785.3803	12.6197	.1095	.1093	.0171	4.3407	.0001
181	. * .	704	688.4025	15.5975	.1350	.1347	.0108	2.7328	.0001
182	. .* .	729	687.6042	41.3958	.3584	.3578	.0119	3.0304	.0005
183	. * . .	621	716.7315	-95.7315	-.8295	-.8290	.0137	3.4764	.0031
184	. * .	696	702.1940	-6.1940	-.0534	-.0533	.0026	.6667	.0000
185	. * .	698	710.8940	-12.8940	-.1111	-.1109	.0029	.7420	.0000
186	. * .	757	744.6183	12.3817	.1070	.1068	.0093	2.3585	.0000
187	. . * .	869	766.6987	102.3013	.8916	.8913	.0251	6.3803	.0059
188	. *. .	724	755.6157	-31.6157	-.2728	-.2723	.0052	1.3328	.0002
189	. * .	784	775.4920	8.5080	.0742	.0740	.0259	6.5856	.0000
190	. . * .	831	758.2297	72.7703	.6381	.6373	.0367	9.3287	.0043
191	. *. .	696	752.2784	-56.2784	-.4849	-.4841	.0023	.5862	.0004
192	. * . .	660	729.1511	-69.1511	-.5973	-.5966	.0076	1.9331	.0010
193	. * . .	521	755.5211	-234.5211	-2.0268	-2.0395	.0085	2.1632	.0129
194	. *. .	827	856.6938	-29.6938	-.2622	-.2618	.0504	12.7961	.0010
195	. .* .	743	709.1081	33.8919	.2931	.2926	.0099	2.5250	.0003
196	. . * .	797	661.2123	135.7877	1.1786	1.1795	.0170	4.3303	.0074
197	. * . .	625	710.9280	-85.9280	-.7439	-.7433	.0120	3.0409	.0022
198	. * . .	746	905.7250	-159.7250	-1.4506	-1.4538	.1018	25.8590	.0622
199	. * .	735	721.4429	13.5571	.1168	.1166	.0028	.7095	.0000
200	. . * .	829	688.5544	140.4456	1.2110	1.2121	.0040	1.0159	.0029
201	. . * .	805	670.3638	134.6362	1.1664	1.1672	.0133	3.3833	.0060
202	. .* .	796	755.2378	40.7622	.3512	.3506	.0024	.5987	.0002
203	. *. .	717	737.0973	-20.0973	-.1737	-.1734	.0092	2.3443	.0001
204	. . * .	821	697.1915	123.8085	1.0667	1.0670	.0025	.6275	.0018
205	. . * .	822	720.8078	101.1922	.8727	.8723	.0044	1.1065	.0016
206	. .* .	802	777.3471	24.6529	.2136	.2132	.0133	3.3834	.0002
207	. * . .	559	701.6846	-142.6846	-1.2290	-1.2302	.0018	.4592	.0022
208	. .* .	797	763.8432	33.1568	.2862	.2857	.0061	1.5597	.0002
209	. *. .	631	682.4986	-51.4986	-.4446	-.4439	.0066	1.6798	.0005
210	* . .	309	697.8924	-388.8924	-3.3597	-3.4310	.0078	1.9758	.0334
211	. * . .	612	753.9824	-141.9824	-1.2267	-1.2279	.0079	2.0068	.0045
212	. * .	748	736.6318	11.3682	.0988	.0986	.0193	4.9072	.0001
213	. . .	0	730.9123	.	.	.	.0082	2.0797	.
214	. * .	721	736.4375	-15.4375	-.1338	-.1335	.0135	3.4213	.0001
215	. . * .	750	670.4005	79.5995	.6914	.6906	.0183	4.6517	.0027
216	. . * .	740	655.8947	84.1053	.7347	.7340	.0294	7.4559	.0046
CASE #	0:........:........:0 -3.0 0.0 3.0	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

```
          -3.0      0.0       3.0
 CASE #   O:........:.........:O   PERF     *PRED      *RESID    *SRESID   *SDRESID    *LEVER    *MAHAL   *COOK D
   217    .         .         .       0  720.4525          .          .          .     .0207    5.2700         .
   218    .         *         .     814  814.6313     -.6313     -.0055     -.0055     .0153    3.8761     .0000
   219    .         .*        .     744  721.0310    22.9690      .1982      .1978     .0051    1.3006     .0001
   220    .         .  *      .     834  722.5909   111.4091      .9629      .9628     .0087    2.2012     .0030
   221    .     *   .         .     595  757.6171  -162.6171    -1.4090    -1.4118     .0135    3.4413     .0088
   222    .      *  .         .     811  933.4507  -122.4507    -1.1129    -1.1135     .1032   26.2009     .0371
   223    .         .*        .     761  727.0628    33.9372      .2922      .2917     .0011     .2752     .0001
   224    .       * .         .     806  884.6004   -78.6004     -.7010     -.7003     .0688   17.4808     .0096
   225    .         *         .     697  696.1728      .8272      .0071      .0071     .0058    1.4831     .0000
   226    .         . *       .     794  735.5636    58.4364      .5048      .5041     .0077    1.9539     .0007
   227    .         .*        .     771  722.9427    48.0573      .4142      .4135     .0032     .8103     .0003
   228    .         .*        .     741  706.0152    34.9848      .3029      .3024     .0121    3.0818     .0004
   229    .         .*        .     729  671.0914    57.9086      .5012      .5004     .0113    2.8695     .0010
   230    .        *.         .     764  786.9606   -22.9606     -.1983     -.1979     .0070    1.7819     .0001
   231    .         . *       .     860  792.4513    67.5487      .5882      .5875     .0235    5.9600     .0024
   232    .      *  .         .     548  672.9452  -124.9452    -1.0818    -1.0822     .0122    3.0969     .0048
   233    .         .   *     .     866  729.5863   136.4137     1.1788     1.1797     .0083    2.0992     .0043
   234    .         . *       .     882  798.4816    83.5184      .7242      .7235     .0152    3.8508     .0026
   235    .        *.         .     700  727.2125   -27.2125     -.2344     -.2340     .0021     .5225     .0001
   236    .      *  .         .     602  719.9777  -117.9777    -1.0159    -1.0159     .0013     .3230     .0013
   237    .         .  *      .     795  687.1860   107.8140      .9329      .9326     .0109    2.7652     .0033
   238    .         .*        .     824  796.3990    27.6010      .2394      .2390     .0160    4.0569     .0003
   239    .         *         .     774  766.8265     7.1735      .0622      .0620     .0140    3.5508     .0000
   240    .         .*        .     798  772.5227    25.4773      .2198      .2194     .0050    1.2735     .0001
   241    . *       .         .     406  702.1940  -296.1940    -2.5522    -2.5808     .0026     .6667     .0107
   242    .         .*        .     778  731.6427    46.3573      .3996      .3989     .0033     .8441     .0003
   243    .         .*        .     790  747.5331    42.4669      .3656      .3650     .0039     .2220     .0002
   244    .         .*        .     810  764.7128    45.2872      .3931      .3925     .0173    4.4002     .0008
   245    .         *         .     694  699.8436    -5.8436     -.0505     -.0504     .0083    2.1105     .0000
   246    .       * .         .     681  744.8804   -63.8804     -.5512     -.5504     .0054    1.3802     .0007
   247    .  *      .         .     432  692.6356  -260.6356    -2.2516    -2.2702     .0078    1.9736     .0150
   248    .       * .         .     653  733.7431   -80.7431     -.6990     -.6983     .0120    3.0477     .0020
   249    .       * .         .     715  773.3761   -58.3761     -.5043     -.5035     .0076    1.9320     .0007
   250    .         .*        .     745  709.4027    35.5973      .3065      .3059     .0011     .2681     .0001
   251    *         .         .     361  739.3869  -378.3869    -3.2637    -3.3286     .0046    1.1771     .0230
   252    .         .*        .     734  684.5361    49.4639      .4302      .4295     .0208    5.2807     .0012
   253    .         .         .       0  685.6868          .          .          .     .0048    1.2302         .
   254    .         *         .     719  724.5443    -5.5443     -.0478     -.0477     .0046    1.1720     .0000
   255    .    *    .         .     506  717.1384  -211.1384    -1.8323    -1.8410     .0166    4.2244     .0176
   256    .      *  .         .     581  678.8356   -97.8356     -.8455     -.8450     .0085    2.1669     .0023
   257    .         . *       .     810  729.9826    80.0174      .6923      .6916     .0106    2.7048     .0018
   258    .        *.         .     782  809.4374   -27.4374     -.2383     -.2378     .0179    4.5382     .0003
   259    .         .*        .     799  744.4240    54.5760      .4731      .4724     .0147    3.7262     .0011
   260    .         *         .     737  727.4012     9.5988      .0830      .0829     .0102    2.5940     .0000
 CASE #   O:........:.........:O   PERF     *PRED      *RESID    *SRESID   *SDRESID    *LEVER    *MAHAL   *COOK D
          -3.0      0.0       3.0
```

CASEWISE PLOT OF STANDARDIZED RESIDUAL

```
*: SELECTED   M: MISSING

              -3.0      0.0      3.0
  CASE #      O:........:........:O    PERF       *PRED      *RESID    *SRESID   *SDRESID     *LEVER     *MAHAL    *COOK D
     261      .         *         .     679    684.1242     -5.1242    -.0442     -.0441      .0056     1.4256      .0000
     262      .         .  *      .     793    697.8267     95.1733     .8226      .8221      .0088     2.2353      .0022
     263      .        *.         .     654    710.9915    -56.9915    -.4910     -.4903      .0024      .6017      .0004
     264      .         .   *     .     837    714.0823    122.9177    1.0584     1.0586      .0012      .3125      .0015
     265      .         .         .       0    750.2848        .          .          .        .0076     1.9444        .
  CASE #      O:........:........:O    PERF       *PRED      *RESID    *SRESID   *SDRESID     *LEVER     *MAHAL    *COOK D
              -3.0      0.0      3.0
```

* *

RESIDUALS STATISTICS:

	MIN	MAX	MEAN	STD DEV	N
*PRED	622.5541	933.4507	732.6588	46.5543	255
*ZPRED	-2.3651	4.3131	.0000	1.0000	255
*SEPRED	7.3042	38.1007	13.7803	4.7812	255
*ADJPRED	620.0224	948.1343	732.8001	47.2500	255
*RESID	-432.0197	231.8339	.0000	115.7468	255
*ZRESID	-3.7103	1.9911	.0000	.9941	255
*SRESID	-3.7549	1.9989	-.0006	1.0016	255
*DRESID	-442.4657	233.6531	-.1412	117.5107	255
*SDRESID	-3.8574	2.0110	-.0031	1.0095	255
*MAHAL	.0035	26.2009	2.9882	3.4577	255
*COOK D	.0000	.0852	.0038	.0086	255
*LEVER	.0000	.1032	.0118	.0136	255

TOTAL CASES = 265

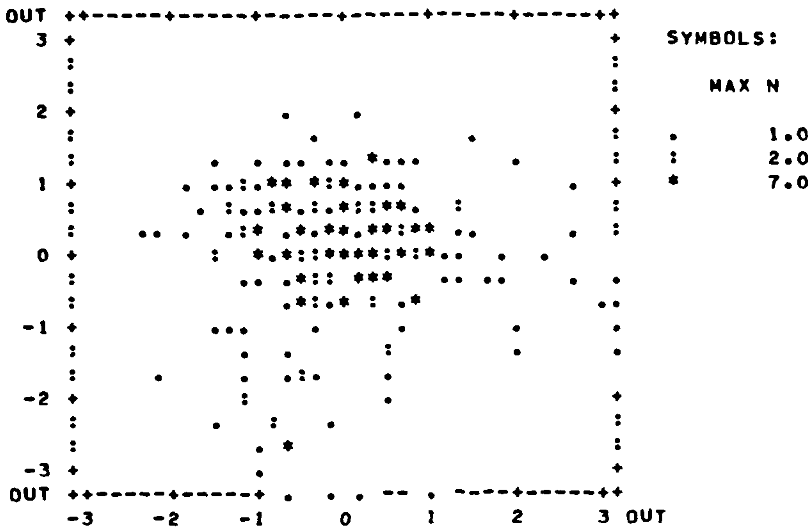
DURBIN-WATSON TEST = 1.84815

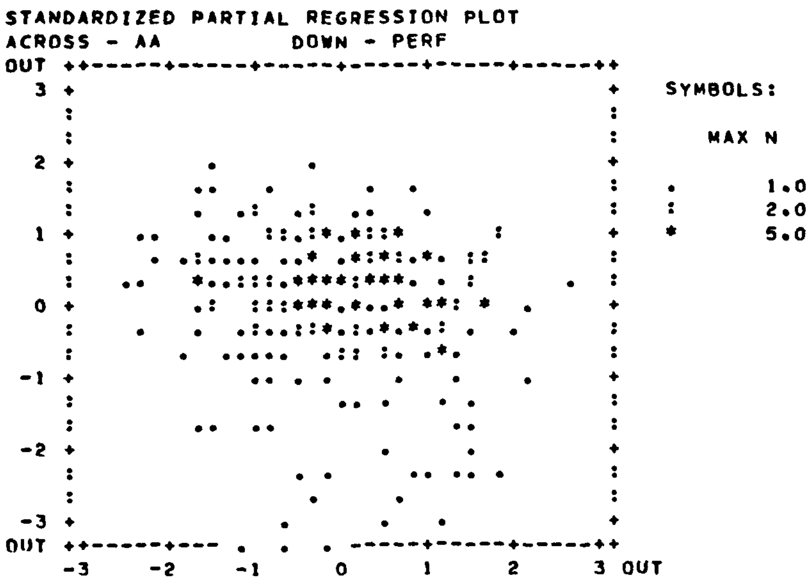
OUTLIERS - STANDARDIZED RESIDUAL

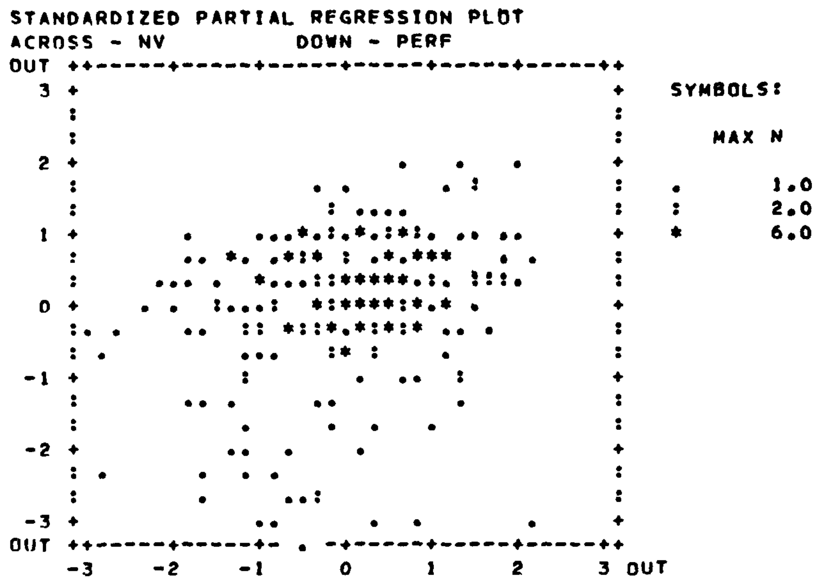
CASE #	*ZRESID
69	-3.71035
210	-3.33995
6	-3.26547
251	-3.24973
5	-2.98545
84	-2.79097
128	-2.74299
241	-2.54382
16	-2.52267
38	-2.46567

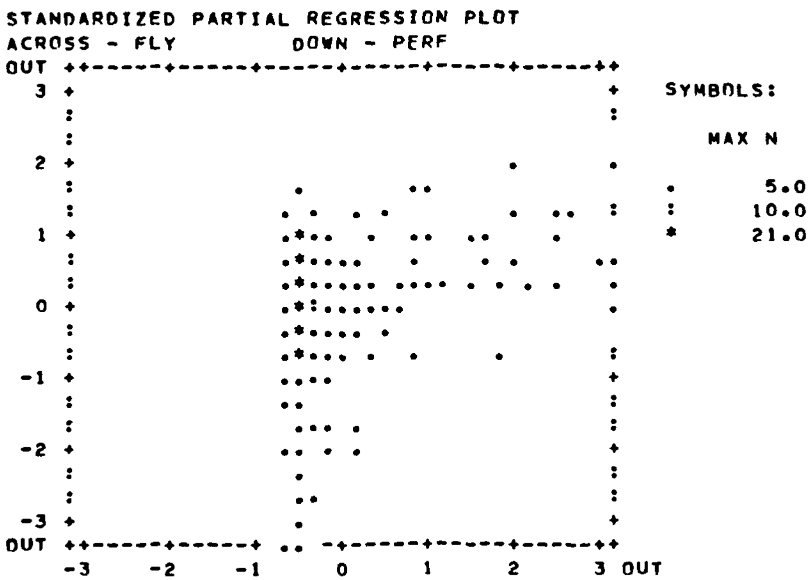
```
HISTOGRAM - STANDARDIZED RESIDUAL
 N EXP N       (* = 1 CASES,    . : = NORMAL CURVE)
 0    .28   OUT
 0    .14  3.00
 0    .20  2.88
 0    .29  2.75
 0    .41  2.63
 0    .56  2.50 .
 0    .76  2.38 .
 0   1.01  2.25 .
 0   1.33  2.13 .
 1   1.72  2.00 *.
 1   2.20  1.88 *.
 1   2.75  1.75 * .
 1   3.40  1.63 * .
 0   4.13  1.50    .
 7   4.94  1.38 ****:**
 4   5.82  1.25 **** .
 9   6.75  1.13 ******:**
12   7.71  1.00 *******:****
11   8.67   .88 ********:**
14   9.60   .75 *********:****
11  10.46   .63 *********:*
12  11.22   .50 **********:*
18  11.85   .38 ***********:******
21  12.32   .25 ***********:*********
19  12.61   .13 ************:******
22  12.71   .00 ************:*********
12  12.61  -.13 ************.
10  12.32  -.25 ********** .
 7  11.85  -.38 *******    .
13  11.22  -.50 ***********:*
 7  10.46  -.63 *******  .
 4   9.60  -.75 ****     .
 5   8.67  -.88 *****   .
 2   7.71 -1.00 **     .
 2   6.75 -1.13 **    .
 4   5.82 -1.25 **** .
 2   4.94 -1.38 **  .
 0   4.13 -1.50    .
 2   3.40 -1.63 **.
 3   2.75 -1.75 **:
 2   2.20 -1.88 *:
 1   1.72 -2.00 *.
 2   1.33 -2.13 :*
 2   1.01 -2.25 :*
 1    .76 -2.38 :
 3    .56 -2.50 :**
 0    .41 -2.63
 2    .29 -2.75 **
 0    .20 -2.88
 1    .14 -3.00 *
 4    .28   OUT ****
```

STANDARDIZED SCATTERPLOT
ACROSS - *PRED DOWN - *RESID

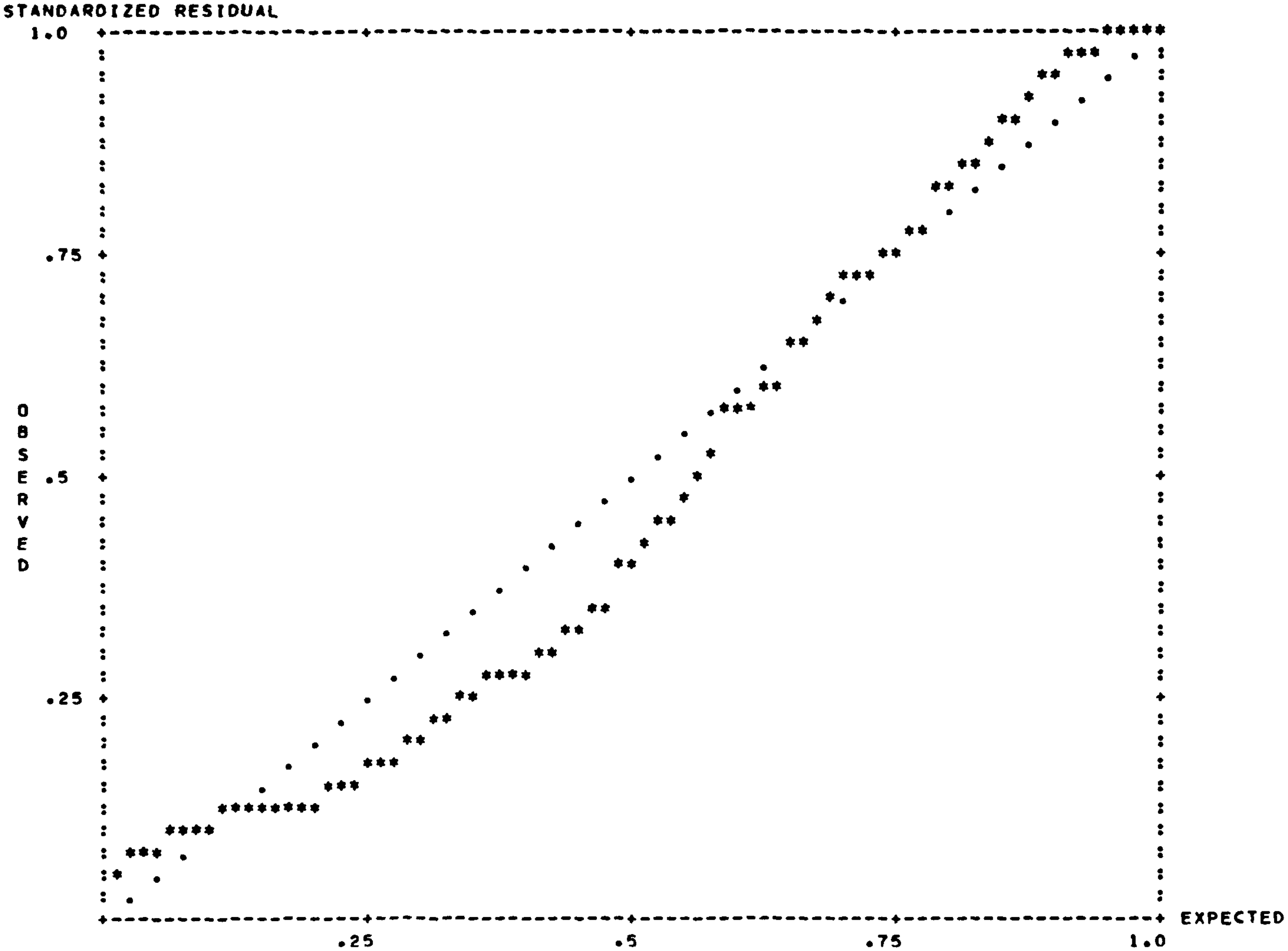



STANDARDIZED PARTIAL REGRESSION PLOT
ACROSS - AA DOWN - PERF
OUT 3 2 1 0 -1 -2 -3 OUT
-3 -2 -1 0 1 2 3 OUT
SYMBOLS:
MAX N
. 1.0
: 2.0
* 5.0


STANDARDIZED PARTIAL REGRESSION PLOT
ACROSS - NV DOWN - PERF
OUT 3 2 1 0 -1 -2 -3 OUT
-3 -2 -1 0 1 2 3 OUT
SYMBOLS:
MAX N
. 1.0
: 2.0
* 6.0


STANDARDIZED PARTIAL REGRESSION PLOT
ACROSS - FLY DOWN - PERF
OUT 3 2 1 0 -1 -2 -3 OUT
-3 -2 -1 0 1 2 3 OUT
SYMBOLS:
MAX N
. 5.0
: 10.0
* 21.0

NORMAL PROBABILITY (P-P) PLOT
STANDARDIZED RESIDUAL



APPENDIX K

**** MULTIPLE REGRESSION ****

CORRELATION, COVARIANCE, 1-TAILED SIG, CROSS-PRODUCT:

	PERF	SEX	GIS	A	SATE	GPA	M	AA
PERF	1.000	.012	.059	.081	.033	-.032	-.031	.020
	15564.635	.311	7667.044	3.418	568.894	-176.256	-7.668	48.275
	.999	.426	.175	.097	.300	.305	.311	.377
	3953417.318	78.906	1947429.129	868.259	144499.000	-44768.965	-1947.671	12261.729
SEX	.012	1.000	-.244	-.080	-.184	.001	.000	-.149
	.311	.045	-54.131	-.006	-5.409	.009	.000	-.621
	.426	.999	.000	.102	.002	.494	.499	.008
	78.906	11.435	-13749.224	-1.447	-1374.000	2.212	-.024	-157.624
GIS	.059	-.244	1.000	.017	.802	.499	-.154	.818
	7667.044	-54.131	1090919.887	5.974	115948.604	23013.905	-319.498	16723.823
	.175	.000	.999	.393	.000	.000	.007	.000
	1947429.129	-13749.224	277093651.349	1517.365	29450945.333	5845531.792	-81152.384	4247851.149
A	.081	-.080	.017	1.000	.000	-.022	.092	-.004
	3.418	-.006	5.974	.113	.016	-.319	.061	-.024
	.097	.102	.393	.999	.498	.366	.072	.477
	868.259	-1.447	1517.365	28.729	4.000	-81.082	15.565	-6.035
SATE	.033	-.184	.802	.000	1.000	.242	-.183	.796
	568.894	-5.409	115948.604	.016	19151.349	1478.526	-50.332	2155.923
	.300	.002	.000	.498	.999	.000	.002	.000
	144499.000	-1374.000	29450945.333	4.000	4864442.667	375545.667	-12784.333	547604.333
GPA	-.032	.001	.499	-.022	.242	1.000	-.093	.191
	-176.256	.009	23013.905	-.319	1478.526	1947.678	-8.146	164.942
	.305	.494	.000	.366	.000	.999	.069	.001
	-44768.965	2.212	5845531.792	-81.082	375545.667	494710.337	-2069.075	41895.192
M	-.031	.000	-.154	.092	-.183	-.093	1.000	-.153
	-7.668	.000	-319.498	.061	-50.332	-8.146	3.936	-5.949
	.311	.499	.007	.072	.002	.069	.999	.007
	-1947.671	-.024	-81152.384	15.565	-12784.333	-2069.075	999.749	-1510.984
AA	.020	-.149	.818	-.004	.796	.191	-.153	1.000
	48.275	-.621	16723.823	-.024	2155.923	164.942	-5.949	383.046
	.377	.008	.000	.477	.000	.001	.007	.999
	12261.729	-157.624	4247851.149	-6.035	547604.333	41895.192	-1510.984	97293.749
PL	.229	-.139	.407	-.020	.396	.059	-.124	.469
	402.153	-.414	5987.832	-.093	771.382	36.520	-3.467	129.082
	.000	.013	.000	.378	.000	.175	.024	.000
	102146.788	-105.271	1520909.247	-23.506	195931.000	9275.976	-880.553	32786.847

*** * * * M U L T I P L E   R E G R E S S I O N * * * ***

	PERF	SEX	GIS	A	SATE	GPA	M	AA
NV	.206	-.104	.580	.105	.547	.158	-.057	.660
	399.323	-.343	9427.665	.550	1178.524	108.661	-1.771	201.146
	.000	.049	.000	.047	.000	.006	.181	.000
	101427.988	-87.071	2394626.847	139.694	299345.000	27599.776	-449.753	51091.047
VB	-.027	-.176	.692	-.073	.689	.126	-.228	.847
	-71.815	-.791	15320.390	-.522	2020.854	117.820	-9.603	351.102
	.333	.002	.000	.122	.000	.022	.000	.000
	-18240.988	-200.929	3891379.153	-132.694	513297.000	29926.224	-2439.247	89179.953
QT	.077	-.107	.677	.083	.641	.211	-.014	.802
	187.928	-.446	13881.431	.548	1740.794	182.844	-.558	308.072
	.111	.044	.000	.093	.000	.000	.410	.000
	47733.776	-113.341	3525883.427	139.188	442161.667	46442.420	-141.639	78250.227

**** MULTIPLE REGRESSION ****

	PL	NV	VR	QT
PERF	.229	.206	-.027	.077
	402.153	399.323	-71.815	187.928
	.000	.000	.333	.111
	102146.788	101427.988	-18240.988	47733.776
SEX	-.139	-.104	-.176	-.107
	-.414	-.343	-.791	-.446
	.013	.049	.002	.044
	-105.271	-87.071	-200.929	-113.341
GIS	.407	.580	.692	.677
	5987.832	9427.665	15320.390	13881.431
	.000	.000	.000	.000
	1520909.247	2394626.847	3891379.153	3525883.427
A	-.020	.105	-.073	.083
	-.093	.550	-.522	.548
	.378	.047	.122	.093
	-23.506	139.694	-132.694	139.188
SATE	.396	.547	.689	.641
	771.382	1178.524	2020.854	1740.794
	.000	.000	.000	.000
	195931.000	299345.000	513297.000	442161.667
GPA	.059	.158	.126	.211
	36.520	108.661	117.820	182.844
	.175	.006	.022	.000
	9275.976	27599.776	29926.224	46442.420
M	-.124	-.057	-.228	-.014
	-3.467	-1.771	-9.603	-.558
	.024	.181	.000	.410
	-880.553	-449.753	-2439.247	-141.639
AA	.469	.660	.847	.802
	129.082	201.146	351.102	308.072
	.000	.000	.000	.000
	32786.847	51091.047	89179.953	78250.227
PL	1.000	.804	.352	.429
	198.001	176.108	104.821	118.411
	.999	.000	.000	.000
	50292.141	44731.341	26624.659	30076.482

**** MULTIPLE REGRESSION ****

	PL	NV	VB	QT
NV	.804	1.000	.340	.775
	176.108	242.322	112.284	236.878
	.000	.999	.000	.000
	44731.341	61549.741	28520.259	60167.082
VB	.352	.340	1.000	.375
	104.821	112.284	448.975	155.823
	.000	.000	.999	.000
	26624.659	28520.259	114039.741	39578.918
QT	.429	.775	.375	1.000
	118.411	236.878	155.823	385.312
	.000	.000	.000	.999
	30076.482	60167.082	39578.918	97869.231

**** MULTIPLE REGRESSION ****

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

DESCRIPTIVE STATISTICS ARE PRINTED ON PAGE   3

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1..   PL

MULTIPLE R	.22908			ANALYSIS OF VARIANCE			
R SQUARE	.05248	R SQUARE CHANGE	.05248		DF	SUM OF SQUARES	MEAN SQUARE
ADJUSTED R SQUARE	.04873	F CHANGE	14.01225	REGRESSION	1	207467.13309	207467.13309
STANDARD ERROR	121.68043	SIGNIF F CHANGE	.0002	RESIDUAL	253	3745950.18456	14806.12721

F =   14.01225   SIGNIF F = .0002

CONDITION NUMBER BOUNDS: 1.000,   1.000

VAR-COVAR MATRIX OF REGRESSION COEFFICIENTS (B)
BELOW DIAGONAL: COVARIANCE   ABOVE: CORRELATION

	PL
PL	.29440

XTX MATRIX

	PL	PERF	SEX	GIS	A	SATE	GPA	M	AA	NV
PL	1.00000	-.22908	.13881	-.40742	.01956	-.39613	-.05881	.12418	-.46871	-.80399
PERF	.22908	.94752	.04354	-.03449	.08595	-.05779	-.04548	-.00253	-.08760	.02144
SEX	-.13881	.04354	.98073	-.18770	-.08255	-.12924	.00909	-.01746	-.08437	.00782
GIS	.40742	-.03449	-.18770	.83401	.02497	.64079	.47531	-.10359	.62715	.25229
A	-.01956	.08595	-.08255	.02497	.99962	.00808	-.02036	.08941	.00556	.12077
SATE	.39613	-.05779	-.12924	.64079	.00808	.84308	.21879	-.13413	.61032	.22859
GPA	.05881	-.04548	.00909	.47531	-.02036	.21879	.99654	-.08573	.16340	.11089
M	-.12418	-.00253	-.01746	-.10359	.08941	-.13413	-.08573	.98458	-.09500	.04251
AA	.46871	-.08760	-.08437	.62715	.00556	.61032	.16340	-.09500	.78031	.28338
NV	.80399	.02144	.00782	.25229	.12077	.22859	.11089	.04251	.28338	.35361
VB	.35157	-.10770	-.12715	.54901	-.06643	.54990	.10532	-.18479	.68185	.05776
QT	.42870	-.02147	-.04763	.50241	.09139	.47101	.18585	.03892	.60096	.43055

**** M U L T I P L E   R E G R E S S I O N ****

EQUATION NUMBER 1   DEPENDENT VARIABLE..   PERF

XTX MATRIX

	VB	QT
PL	-.35157	-.42870
PERF	-.10770	-.02147
SEX	-.12715	-.04763
GIS	.54901	.50241
A	-.06643	.09139
SATE	.54990	.47101
GPA	.10532	.18585
M	-.18479	.03892
AA	.68185	.60096
NV	.05776	.43055
VB	.87640	.22392
QT	.22392	.81622

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	95% CONFDNCE INTRVL B		BETA	SE BETA	CORREL	PART COR	PARTIAL	TOLERANCE	T
PL	2.031069	.542589	.962503	3.099634	.229081	.061198	.229081	.229081	.229081	1.000000	3.743
(CONSTANT)	590.699077	38.681704	514.519915	666.878238							15.271

IN

VARIABLE	SIG T
PL	.0002
(CONSTANT)	.0000

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	MIN TOLER	T	SIG T
SEX	.044390	.045162	.980731	.980731	.718	.4736
GIS	-.041358	-.038802	.834011	.834011	-.616	.5382
A	.085983	.088315	.999618	.999618	1.407	.1605
SATE	-.068552	-.064664	.843082	.843082	-1.029	.3046
GPA	-.045642	-.046807	.996542	.996542	-.744	.4577
M	-.002572	-.002622	.984579	.984579	-.042	.9668
AA	-.112266	-.101880	.780308	.780308	-1.626	.1053
NV	.060630	.037038	.353606	.353606	.588	.5568
VB	-.122893	-.118191	.876402	.876402	-1.889	.0600
QT	-.026302	-.024411	.816216	.816216	-.388	.6986

END BLOCK NUMBER 1   PIN = .050 LIMITS REACHED.

* * * * M U L T I P L E   R E G R E S S I O N * * * *

EQUATION NUMBER 1   DEPENDENT VARIABLE.. PERF

SUMMARY TABLE

STEP	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH	FCH	SIGCH		VARIABLE	BETAIN	CORREL
1	.2291	.0525	.0487	14.012	.000	.0525	14.012	.000	IN:	PL	.2291	.2291

```
EQUATION NUMBER 1    DEPENDENT VARIABLE..   PERF

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

        -3.0      0.0       3.0
CASE #  O:........:........:O   PERF    *PRED      *RESID    *SRESID  *SDRESID   *LEVER   *MAHAL  *COOK D
     1  .        *.         .    664  698.3457   -34.3457    -.2836    -.2831    .0057   1.4415    .0004
     2  .         *         .    704  702.4078     1.5922     .0131     .0131    .0044   1.1204    .0000
     3  .         .*        .    775  730.8428    44.1572     .3636     .3630    .0000    .0040    .0003
     4  .       * .         .    630  714.5943   -84.5943    -.6971    -.6964    .0016    .3995    .0013
     5  .*        .         .    336  698.3457  -362.3457   -2.9922   -3.0406    .0057   1.4415    .0434
     6  *         .         .    341  745.0603  -404.0603   -3.3284   -3.3971    .0007    .1883    .0259
     7  .         *         .    746  761.3088   -15.3088    -.1263    -.1261    .0040   1.0049    .0001
     8  .         .*        .    831  781.6195    49.3805     .4090     .4083    .0116   2.9348    .0013
     9  .         .    *    .    939  724.7496   214.2504    1.7645    1.7719    .0003    .0766    .0066
    10  .         .  *      .    832  708.5011   123.4989    1.0184    1.0185    .0028    .7145    .0035
    11  .         . *       .    797  712.5632    84.4368     .6960     .6953    .0019    .4944    .0014
    12  .         .         .      0  783.6506          .         .         .    .0123   3.1319        .
    13  .        *.         .    685  706.4700   -21.4700    -.1771    -.1767    .0033    .8397    .0001
    14  .        *.         .    690  745.0603   -55.0603    -.4536    -.4528    .0007    .1883    .0005
    15  .         .   *     .    915  767.4020   147.5980    1.2189    1.2201    .0058   1.4778    .0073
    16  . *       .         .    410  726.7807  -316.7807   -2.6087   -2.6393    .0002    .0423    .0140
    17  .        *.         .    717  765.3710   -48.3710    -.3993    -.3987    .0052   1.3101    .0007
    18  .         .*        .    750  696.3146    53.6854     .4435     .4428    .0064   1.6172    .0010
    19  .         .*        .    818  781.6195    36.3805     .3013     .3008    .0116   2.9348    .0007
    20  .         .   *     .    913  765.3710   147.6290    1.2188    1.2200    .0052   1.3101    .0068
    21  .       * .         .    672  734.9049   -62.9049    -.5180    -.5172    .0000    .0062    .0005
    22  .         *         .    753  755.2156    -2.2156    -.0183    -.0182    .0025    .6229    .0000
    23  .         .  *      .    849  726.7807   122.2193    1.0065    1.0065    .0002    .0423    .0021
    24  .         *         .    799  787.7127    11.2873     .0936     .0934    .0146   3.7107    .0001
    25  .         .*        .    713  682.0972    30.9028     .2561     .2556    .0123   3.1299    .0005
    26  .         *         .    743  747.0914    -4.0914    -.0337    -.0336    .0010    .2550    .0000
    27  .         .  *      .    836  712.5632   123.4368    1.0174    1.0175    .0019    .4944    .0031
    28  .         .   *     .    871  724.7496   146.2504    1.2045    1.2055    .0003    .0766    .0031
    29  .        *.         .    670  696.3146   -26.3146    -.2174    -.2170    .0064   1.6172    .0002
    30  .         .     *   .    990  726.7807   263.2193    2.1676    2.1837    .0002    .0423    .0096
    31  .         .*        .    816  759.2778    56.7222     .4679     .4672    .0034    .8675    .0008
    32  .         . *       .    830  767.4020    62.5980     .5170     .5162    .0058   1.4778    .0013
    33  .       * .         .    689  771.4642   -82.4642    -.6815    -.6808    .0073   1.8436    .0026
    34  .         .*        .    766  720.6875    45.3125     .3733     .3726    .0007    .1755    .0003
    35  .       * .         .    667  767.4020  -100.4020    -.8292    -.8287    .0058   1.4778    .0034
    36  .         .  *      .    898  757.2467   140.7533    1.1607    1.1615    .0029    .7402    .0046
    37  .         . *       .    813  732.8739    80.1261     .6598     .6591    .0000    .0001    .0009
    38  .  *      .         .    410  704.4389  -294.4389   -2.4292   -2.4532    .0038    .9750    .0231
    39  .      *  .         .    565  698.3457  -133.3457   -1.1012   -1.1016    .0057   1.4415    .0059
    40  .         .   *     .    924  759.2778   164.7222    1.3587    1.3610    .0034    .8675    .0068
CASE #  O:........:........:O   PERF    *PRED      *RESID    *SRESID  *SDRESID   *LEVER   *MAHAL  *COOK D
        -3.0      0.0       3.0
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CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

```
          -3.0      0.0      3.0
  CASE #  0:........:........:0   PERF      *PRED      *RESID   *SRESID  *SDRESID    *LEVER    *MAHAL   *COOK D
     41   .        *.         .    658   706.4700    -48.4700    -.3998    -.3991     .0033     .8397     .0006
     42   .         .*        .    825   783.6506     41.3494     .3427     .3421     .0125    3.1834     .0010
     43   .         .*        .    800   740.9982     59.0018     .4859     .4852     .0003     .0851     .0005
     44   .       * .         .    645   718.6564    -73.6564    -.6068    -.6060     .0009     .2400     .0009
     45   .        *.         .    720   779.5885    -59.5885    -.4933    -.4926     .0106    2.6964     .0018
     46   .         *         .    777   785.6817     -8.6817    -.0720    -.0718     .0136    3.4420     .0000
     47   .         .*        .    750   724.7496     25.2504     .2080     .2076     .0003     .0766     .0001
     48   .         *         .    720   706.4700     13.5300     .1116     .1114     .0033     .8397     .0000
     49   .         .*        .    728   688.1904     39.8096     .3294     .3288     .0095    2.4210     .0007
     50   .         .  *      .    827   708.5011    118.4989     .9771     .9771     .0028     .7145     .0032
     51   .         . *       .    852   767.4020     84.5980     .6987     .6979     .0058    1.4778     .0024
     52   .       * .         .    654   747.0914    -93.0914    -.7669    -.7663     .0010     .2550     .0015
     53   .         . *       .    822   740.9982     81.0018     .6671     .6664     .0003     .0851     .0010
     54   .       * .         .    661   743.0292    -82.0292    -.6756    -.6749     .0005     .1317     .0010
     55   .         .*        .    750   722.7185     27.2815     .2247     .2243     .0005     .1210     .0001
     56   .         .*        .    734   706.4700     27.5300     .2271     .2266     .0033     .8397     .0002
     57   .         . *       .    778   716.6253     61.3747     .5057     .5050     .0012     .3147     .0007
     58   .        *.         .    657   700.3768    -43.3768    -.3581    -.3575     .0050    1.2759     .0006
     59   .         .  *      .    821   716.6253    104.3747     .8600     .8596     .0012     .3147     .0019
     60   .         *         .    708   718.6564    -10.6564    -.0878    -.0876     .0009     .2400     .0000
     61   .       * .         .    682   743.0292    -61.0292    -.5027    -.5019     .0005     .1317     .0006
     62   .         .   *     .    851   706.4700    144.5300    1.1921    1.1931     .0033     .8397     .0052
     63   .         .  *      .    815   696.3146    118.6854     .9804     .9804     .0064    1.6172     .0050
     64   .         . *       .    799   726.7807     72.2193     .5947     .5940     .0002     .0423     .0007
     65   .    *    .         .    499   684.1282   -185.1282   -1.5332   -1.5373     .0114    2.8835     .0182
     66   .         *         .    680   682.0972     -2.0972    -.0174    -.0173     .0123    3.1299     .0000
     67   .         .  *      .    857   718.6564    138.3436    1.1397    1.1404     .0009     .2400     .0032
     68   .         . *       .    825   734.9049     90.0951     .7419     .7412     .0000     .0062     .0011
     69   *         .         .    348   783.6506   -435.6506   -3.6101   -3.6995     .0125    3.1834     .1090
     70   .         .*        .    736   700.3768     35.6232     .2941     .2935     .0050    1.2759     .0004
     71   .         *         .    707   722.7185    -15.7185    -.1295    -.1292     .0005     .1210     .0000
     72   .       * .         .    659   753.1846    -94.1846    -.7763    -.7757     .0020     .5158     .0018
     73   .   *     .         .    445   700.3768   -255.3768   -2.1082   -2.1228     .0050    1.2759     .0201
     74   .       * .         .    706   769.4331    -63.4331    -.5241    -.5233     .0065    1.6557     .0014
     75   .         .     *   .    931   682.0972    248.9028    2.0624    2.0758     .0123    3.1299     .0351
     76   .         . *       .    819   740.9982     78.0018     .6424     .6417     .0003     .0851     .0009
     77   .         . *       .    789   706.4700     82.5300     .6807     .6800     .0033     .8397     .0017
     78   .         *         .    751   749.1224      1.8776     .0155     .0154     .0013     .3318     .0000
     79   .         .     *   .    995   763.3399    231.6601    1.9119    1.9221     .0045    1.1525     .0156
     80   .         .*        .    786   765.3710     20.6290     .1703     .1700     .0052    1.3101     .0001
     81   .         *         .    750   765.3710    -15.3710    -.1269    -.1267     .0052    1.3101     .0001
     82   .       * .         .    702   765.3710    -63.3710    -.5232    -.5224     .0052    1.3101     .0013
     83   .         . *       .    781   700.3768     80.6232     .6656     .6648     .0050    1.2759     .0020
     84   . *       .         .    377   696.3146   -319.3146   -2.6378   -2.6696     .0064    1.6172     .0362
  CASE #  0:........:........:0   PERF      *PRED      *RESID   *SRESID  *SDRESID    *LEVER    *MAHAL   *COOK D
          -3.0      0.0      3.0
```

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED M: MISSING

CASE #	-3.0 0.0 3.0 O:........:........:O	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D
85	. * . .	515	704.4389	-189.4389	-1.5629	-1.5674	.0038	.9750	.0096
86	. . * .	799	730.8428	68.1572	.5612	.5605	.0000	.0040	.0006
87	. .* .	778	747.0914	30.9086	.2546	.2542	.0010	.2550	.0002
88	. * .	765	745.0603	19.9397	.1643	.1639	.0007	.1883	.0001
89	. *. .	725	775.5263	-50.5263	-.4179	-.4172	.0089	2.2498	.0011
90	. . * .	903	749.1224	153.8776	1.2679	1.2695	.0013	.3318	.0042
91	. .* .	821	765.3710	55.6290	.4593	.4585	.0052	1.3101	.0010
92	. .* .	784	763.3399	20.6601	.1705	.1702	.0045	1.1525	.0001
93	. . * .	837	724.7496	112.2504	.9245	.9242	.0003	.0766	.0018
94	. . .	0	732.8739	.	.	.	.0000	.0001	.
95	. . * .	804	714.5943	89.4057	.7368	.7361	.0016	.3995	.0015
96	. *. .	683	714.5943	-31.5943	-.2604	-.2599	.0016	.3995	.0002
97	. . * .	840	732.8739	107.1261	.8821	.8817	.0000	.0001	.0015
98	. . * .	826	732.8739	93.1261	.7668	.7662	.0000	.0001	.0012
99	. *. .	678	708.5011	-30.5011	-.2515	-.2510	.0028	.7145	.0002
100	. * .	761	743.0292	17.9708	.1480	.1477	.0005	.1317	.0000
101	. . * .	837	716.6253	120.3747	.9918	.9918	.0012	.3147	.0026
102	. . * .	832	734.9049	97.0951	.7995	.7990	.0000	.0062	.0013
103	. . * .	823	732.8739	90.1261	.7421	.7415	.0000	.0001	.0011
104	. *. .	683	724.7496	-41.7496	-.3438	-.3432	.0003	.0766	.0003
105	. *. .	740	769.4331	-29.4331	-.2432	-.2427	.0065	1.6557	.0003
106	. .* .	792	769.4331	22.5669	.1864	.1861	.0065	1.6557	.0002
107	. * .	768	781.6195	-13.6195	-.1128	-.1126	.0116	2.9348	.0001
108	. * . .	437	708.5011	-271.5011	-2.2388	-2.2569	.0028	.7145	.0170
109	. * .	734	751.1535	-17.1535	-.1414	-.1411	.0016	.4188	.0001
110	. * .	702	712.5632	-10.5632	-.0871	-.0869	.0019	.4944	.0000
111	. .* .	774	732.8739	41.1261	.3386	.3381	.0000	.0001	.0002
112	. . * .	787	684.1282	102.8718	.8520	.8515	.0114	2.8835	.0056
113	. .* .	800	757.2467	42.7533	.3526	.3520	.0029	.7402	.0004
114	. .* .	793	771.4642	21.5358	.1780	.1776	.0073	1.8436	.0002
115	. * .	769	751.1535	17.8465	.1471	.1468	.0016	.4188	.0001
116	. . .	0	747.0914	.	.	.	.0010	.2538	.
117	. * .	740	730.8428	9.1572	.0754	.0753	.0000	.0040	.0000
118	. * . .	532	745.0603	-213.0603	-1.7551	-1.7624	.0007	.1883	.0072
119	. * . .	433	698.3457	-265.3457	-2.1912	-2.2079	.0057	1.4415	.0233
120	. . * .	962	781.6195	180.3805	1.4940	1.4977	.0116	2.9348	.0175
121	. .* .	748	704.4389	43.5611	.3594	.3588	.0038	.9750	.0005
122	. .* .	783	730.8428	52.1572	.4295	.4288	.0000	.0040	.0004
123	. *. .	730	753.1846	-23.1846	-.1911	-.1907	.0020	.5158	.0001
124	. .* .	783	753.1846	29.8154	.2458	.2453	.0020	.5158	.0002
125	. * .	708	700.3768	7.6232	.0629	.0628	.0050	1.2759	.0000
126	. . * .	808	734.9049	73.0951	.6019	.6011	.0000	.0062	.0007
127	. .* .	735	702.4078	32.5922	.2690	.2685	.0044	1.1204	.0003
128	.* . .	370	722.7185	-352.7185	-2.9051	-2.9490	.0005	.1210	.0186
CASE #	O:........:........:O -3.0 0.0 3.0	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

```
          -3.0      0.0       3.0
CASE #    0:........:........:0   PERF      *PRED      *RESID    *SRESID   *SDRESID     *LEVER     *MAHAL    *COOK D
   129    .         .         .      0   747.0914         .          .          .       .0010      .2538          .
   130    .        *.         .    728   769.4331    -41.4331     -.3423     -.3417      .0065     1.6557      .0006
   131    .         .  *      .    854   751.1535    102.8465      .8476      .8471      .0016      .4188      .0020
   132    .         .         .      0   785.6817         .          .          .       .0133     3.3829          .
   133    .         .  *      .    851   743.0292    107.9708      .8893      .8889      .0005      .1317      .0018
   134    .         *         .    734   738.9671     -4.9671     -.0409     -.0408      .0002      .0487      .0000
   135    .         *         .    751   743.0292      7.9708      .0657      .0655      .0005      .1317      .0000
   136    .        *.         .    686   743.0292    -57.0292     -.4697     -.4690      .0005      .1317      .0005
   137    .         .*        .    813   763.3399     49.6601      .4099      .4092      .0045     1.1525      .0007
   138    .        *.         .    682   722.7185    -40.7185     -.3354     -.3348      .0005      .1210      .0002
   139    .         .    *    .    995   779.5885    215.4115     1.7833     1.7911      .0106     2.6964      .0235
   140    .        *.         .    701   757.2467    -56.2467     -.4638     -.4631      .0029      .7402      .0007
   141    .         . *       .    770   702.4078     67.5922      .5578      .5571      .0044     1.1204      .0013
   142    .         . *       .    817   720.6875     96.3125      .7934      .7928      .0007      .1755      .0015
   143    .       * .         .    625   718.6564    -93.6564     -.7716     -.7710      .0009      .2400      .0015
   144    .         .  *      .    847   714.5943    132.4057     1.0911     1.0916      .0016      .3995      .0033
   145    .         .  *      .    851   710.5321    140.4679     1.1580     1.1588      .0024      .5994      .0042
   146    .         .*        .    761   730.8428     30.1572      .2483      .2479      .0000      .0040      .0001
   147    .         . *       .    831   765.3710     65.6290      .5418      .5411      .0052     1.3101      .0013
   148    .         *         .    754   761.3088     -7.3088     -.0603     -.0602      .0040     1.0049      .0000
   149    .         .   *     .    881   734.9049    146.0951     1.2030     1.2041      .0000      .0062      .0029
   150    .  *      .         .    466   745.0603   -279.0603    -2.2988    -2.3185      .0007      .1883      .0124
   151    .         .         .      0   704.4389         .          .          .       .0038      .9675          .
   152    .         *         .    713   694.2836     18.7164      .1547      .1544      .0071     1.8030      .0001
   153    .         .*        .    733   694.2836     38.7164      .3199      .3194      .0071     1.8030      .0006
   154    .       * .         .    689   761.3088    -72.3088     -.5966     -.5958      .0040     1.0049      .0014
   155    .       * .         .    670   747.0914    -77.0914     -.6351     -.6344      .0010      .2550      .0010
   156    .         .*        .    808   767.4020     40.5980      .3353      .3347      .0058     1.4778      .0006
   157    .         *         .    735   730.8428      4.1572      .0342      .0342      .0000      .0040      .0000
   158    .   *     .         .    466   718.6564   -252.6564    -2.0815    -2.0954      .0009      .2400      .0106
   159    .         .  *      .    898   781.6195    116.3805      .9639      .9638      .0116     2.9348      .0073
   160    .         . *       .    814   743.0292     70.9708      .5846      .5838      .0005      .1317      .0008
   161    .    *    .         .    554   757.2467   -203.2467    -1.6761    -1.6821      .0029      .7402      .0097
   162    .    *    .         .    505   714.5943   -209.5943    -1.7272    -1.7341      .0016      .3995      .0082
   163    .         .  *      .    839   716.6253    122.3747     1.0083     1.0083      .0012      .3147      .0026
   164    .  *      .         .    390   692.2525   -302.2525    -2.4988    -2.5252      .0079     1.9989      .0372
   165    .         *         .    693   708.5011    -15.5011     -.1278     -.1276      .0028      .7145      .0001
   166    .         .  *      .    854   716.6253    137.3747     1.1319     1.1325      .0012      .3147      .0033
   167    .       * .         .    653   720.6875    -67.6875     -.5576     -.5568      .0007      .1755      .0007
   168    .       * .         .    664   761.3088    -97.3088     -.8029     -.8023      .0040     1.0049      .0026
   169    .         *         .    775   787.7127    -12.7127     -.1055     -.1053      .0146     3.7107      .0001
   170    .         *         .    748   734.9049     13.0951      .1078      .1076      .0000      .0062      .0000
   171    .       * .         .    676   751.1535    -75.1535     -.6194     -.6186      .0016      .4188      .0011
   172    .         .*        .    845   785.6817     59.3183      .4918      .4911      .0136     3.4420      .0022
CASE #    0:........:........:0   PERF      *PRED      *RESID    *SRESID   *SDRESID     *LEVER     *MAHAL    *COOK D
          -3.0      0.0       3.0
```

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

CASE #	-3.0 0:........:........:0 3.0 (0.0)	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D
173	. *. .	622	673.9729	-51.9729	-.4316	-.4309	.0166	4.2165	.0020
174	. .* .	765	722.7185	42.2815	.3482	.3476	.0005	.1210	.0003
175	. . * .	790	716.6253	73.3747	.6046	.6038	.0012	.3147	.0009
176	. . * .	840	732.8739	107.1261	.8821	.8817	.0000	.0001	.0015
177	. * .	757	765.3710	-8.3710	-.0691	-.0690	.0052	1.3101	.0000
178	. .* .	793	734.9049	58.0951	.4784	.4777	.0000	.0062	.0005
179	. . * .	849	716.6253	132.3747	1.0907	1.0911	.0012	.3147	.0031
180	. * .	798	787.7127	10.2873	.0853	.0852	.0146	3.7107	.0001
181	. *. .	704	724.7496	-20.7496	-.1709	-.1706	.0003	.0766	.0001
182	. * .	729	730.8428	-1.8428	-.0152	-.0151	.0000	.0040	.0000
183	. * . .	621	692.2525	-71.2525	-.5891	-.5883	.0079	1.9989	.0021
184	. * .	696	706.4700	-10.4700	-.0864	-.0862	.0033	.8397	.0000
185	. * .	698	706.4700	-8.4700	-.0699	-.0697	.0033	.8397	.0000
186	. *. .	757	783.6506	-26.6506	-.2208	-.2204	.0125	3.1834	.0004
187	. . * .	869	720.6875	148.3125	1.2217	1.2229	.0007	.1755	.0035
188	. * .	724	743.0292	-19.0292	-.1567	-.1564	.0005	.1317	.0001
189	. .* .	784	763.3399	20.6601	.1705	.1702	.0045	1.1525	.0001
190	. . * .	831	712.5632	118.4368	.9762	.9761	.0019	.4944	.0028
191	. * . .	696	757.2467	-61.2467	-.5051	-.5043	.0029	.7402	.0009
192	. * . .	660	740.9982	-80.9982	-.6671	-.6664	.0003	.0851	.0010
193	. * . .	521	734.9049	-213.9049	-1.7614	-1.7688	.0000	.0062	.0061
194	. . * .	827	765.3710	61.6290	.5088	.5081	.0052	1.3101	.0012
195	. .* .	743	700.3768	42.6232	.3519	.3513	.0050	1.2759	.0006
196	. . * .	797	686.1593	110.8407	.9175	.9172	.0104	2.6472	.0061
197	. * . .	625	706.4700	-81.4700	-.6720	-.6712	.0033	.8397	.0016
198	. * .	746	740.9982	5.0018	.0412	.0411	.0003	.0851	.0000
199	. * .	735	718.6564	16.3436	.1346	.1344	.0009	.2400	.0000
200	. . * .	829	698.3457	130.6543	1.0789	1.0793	.0057	1.4415	.0056
201	. . * .	805	702.4078	102.5922	.8467	.8462	.0044	1.1204	.0030
202	. . * .	796	714.5943	81.4057	.6709	.6701	.0016	.3995	.0012
203	. *. .	717	759.2778	-42.2778	-.3487	-.3481	.0034	.8675	.0004
204	. . * .	821	712.5632	108.4368	.8938	.8934	.0019	.4944	.0024
205	. . * .	822	738.9671	83.0329	.6838	.6831	.0002	.0487	.0010
206	. .* .	802	765.3710	36.6290	.3024	.3019	.0052	1.3101	.0004
207	. * . .	559	712.5632	-153.5632	-1.2657	-1.2673	.0019	.4944	.0047
208	. * .	797	781.6195	15.3805	.1274	.1271	.0116	2.9348	.0001
209	. * . .	631	692.2525	-61.2525	-.5064	-.5056	.0079	1.9989	.0015
210	* . .	309	702.4078	-393.4078	-3.2467	-3.3099	.0044	1.1204	.0443
211	. * . .	612	743.0292	-131.0292	-1.0792	-1.0796	.0005	.1317	.0026
212	. . * .	748	680.0661	67.9339	.5632	.5624	.0133	3.3864	.0028
213	. . .	0	716.6253	.	.	.	.0012	.3131	.
214	. .* .	721	692.2525	28.7475	.2377	.2372	.0079	1.9989	.0003
215	. . * .	750	686.1593	63.8407	.5285	.5277	.0104	2.6472	.0020
216	. .* .	740	700.3768	39.6232	.3271	.3265	.0050	1.2759	.0005
CASE #	0:........:........:0 -3.0 0.0 3.0	PERF	*PRED	*RESID	*SRESID	*SDRESID	*LEVER	*MAHAL	*COOK D

CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

```
          -3.0      0.0      3.0
 CASE #   0:........:........:0   PERF     *PRED      *RESID   *SRESID  *SDRESID    *LEVER    *MAHAL   *COOK D
   217    .         .         .      0  684.1282        .         .         .        .0111    2.8401      .
   218    .         .*        .    814  773.4952    40.5048     .3349     .3343      .0080    2.0416    .0007
   219    .         *         .    744  745.0603    -1.0603    -.0087    -.0087      .0007     .1883    .0000
   220    .         .  *      .    834  694.2836   139.7164    1.1546    1.1554      .0071    1.8030    .0074
   221    .    *    .         .    595  789.7438  -194.'438   -1.6164   -1.6216      .0157    3.9896    .0262
   222    .         .*        .    811  779.5885    31.4:15     .2600     .2596      .0106    2.6964    .0005
   223    .         .*        .    761  734.9049    26.0951     .2149     .2145      .0000     .0062    .0001
   224    .         .*        .    806  763.3399    42.6601     .3521     .3515      .0045    1.1525    .0005
   225    .        *.         .    697  743.0292   -46.0292    -.3791    -.3785      .0005     .1317    .0003
   226    .         *         .    794  783.6506    10.3494     .0858     .0856      .0125    3.1834    .0001
   227    .         .*        .    771  738.9671    32.0329     .2638     .2633      .0002     .0487    .0001
   228    .         .*        .    741  696.3146    44.6854     .3691     .3685      .0064    1.6172    .0007
   229    .         .*        .    729  700.3768    28.6232     .2363     .2359      .0050    1.2759    .0003
   230    .         *         .    764  753.1846    10.8154     .0891     .0890      .0020     .5158    .0000
   231    .         .  *      .    860  757.2467   102.7533     .8474     .8469      .0029     .7402    .0025
   232    .     *   .         .    548  698.3457  -150.3457   -1.2416   -1.2429      .0057    1.4415    .0075
   233    .         .   *     .    866  698.3457   167.6543    1.3845    1.3870      .0057    1.4415    .0093
   234    .         .  *      .    882  775.5263   106.4737     .8807     .8803      .0089    2.2498    .0050
   235    .        *.         .    700  759.2778   -59.2778    -.4890    -.4882      .0034     .8675    .0009
   236    .      *  .         .    602  734.9049  -132.9049   -1.0944   -1.0948      .0000     .0062    .0024
   237    .         . *       .    795  696.3146    98.6854     .8152     .8147      .0064    1.6172    .0035
   238    .         . *       .    824  743.0292    80.9708     .6669     .6662      .0005     .1317    .0010
   239    .         *         .    774  785.6817   -11.6817    -.0969    -.0967      .0136    3.4420    .0001
   240    .         .*        .    798  753.1846    44.8154     .3694     .3688      .0020     .5158    .0004
   241    . *       .         .    406  724.7496  -318.7496   -2.6251   -2.6563      .0003     .0766    .0146
   242    .         .*        .    778  718.6564    59.3436     .4889     .4882      .0009     .2400    .0006
   243    .         .*        .    790  738.9671    51.0329     .4203     .4196      .0002     .0487    .0004
   244    .         . *       .    810  724.7496    85.2504     .7021     .7014      .0003     .0766    .0010
   245    .         *         .    694  688.1904     5.8096     .0481     .0480      .0095    2.4210    .0000
   246    .         *         .    681  698.3457   -17.3457    -.1432    -.1430      .0057    1.4415    .00(:
   247    .  *      .         .    432  730.8428  -298.8428   -2.4608   -2.4859      .0000     .0040    .0120
   248    .        *.         .    653  694.2836   -41.2836    -.3412    -.3406      .0071    1.8030    .0006
   249    .        *.         .    715  763.3399   -48.3399    -.3990    -.3983      .0045    1.1525    .0007
   250    .         .*        .    745  714.5943    30.4057     .2506     .2501      .0016     .3995    .0002
   251    *         .         .    361  781.6195  -420.6195   -3.4838   -3.5635      .0118    2.9348    .0954
   252    .         .*        .    734  694.2836    39.7164     .3282     .3276      .0071    1.8030    .0006
   253    .         .         .      0  698.3457        .         .         .        .0056    1.4278      .
   254    .         *         .    719  704.4389    14.5611     .1201     .1199      .0038     .9750    .0001
   255    .    *    .         .    506  726.7807  -220.7807   -1.8182   -1.8265      .0002     .0423    .0068
   256    .      *  .         .    581  722.7185  -141.7185   -1.1672   -1.1681      .0005     .1210    .0030
   257    .         .  *      .    810  708.5011   101.4989     .8370     .8365      .0028     .7145    .0024
   258    .         .*        .    782  726.7807    55.2193     .4547     .4540      .0002     .0423    .0004
   259    .         .*        .    799  773.4952    25.5048     .2109     .2105      .0080    2.0416    .0003
   260    .         .*        .    737  706.4700    30.5300     .2518     .2513      .0033     .8397    .0002
 CASE #   0:........:........:0   PERF     *PRED      *RESID   *SRESID  *SDRESID    *LEVER    *MAHAL   *COOK D
          -3.0      0.0      3.0
```

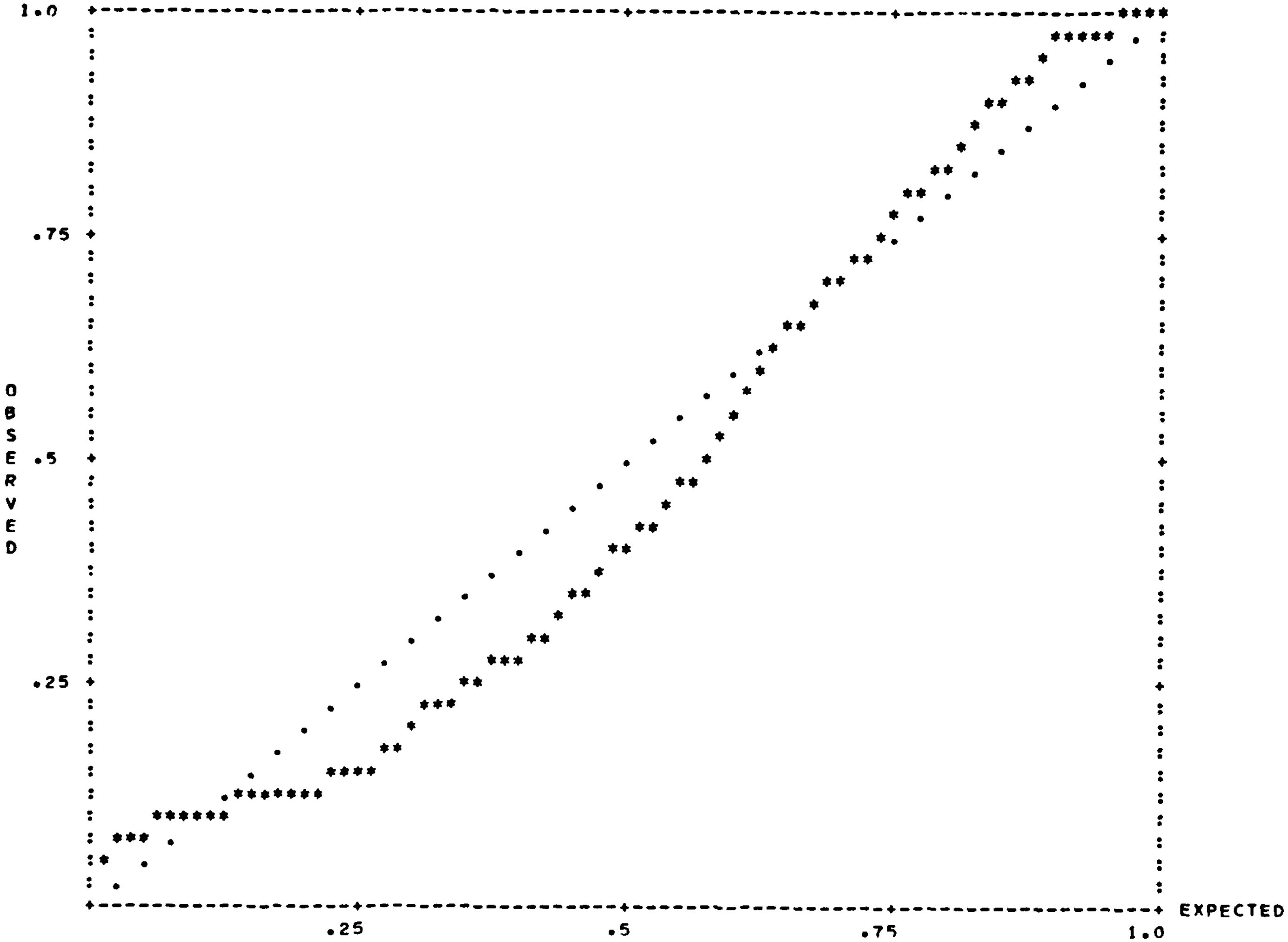
```
CASEWISE PLOT OF STANDARDIZED RESIDUAL

*: SELECTED   M: MISSING

             -3.0       0.0       3.0
  CASE #     O:........:........:O    PERF       *PRED      *RESID     *SRESID    *SDRESID      *LEVER      *MAHAL     *COOK D
     261     .          *         .    679    694.2836   -15.2836     -.1263     -.1261       .0071      1.8030       .0001
     262     .          . *       .    793    704.4389    88.5611      .7307      .7300       .0038       .9750       .0021
     263     .        * .         .    654    722.7185   -68.7185     -.5660     -.5652       .0005       .1210       .0007
     264     .          . *       .    837    743.0292    93.9708      .7740      .7734       .0005       .1317       .0013
     265     .          .         .      0    749.1224       .          .          .          .0013       .3301        .
  CASE #     O:........:........:O    PERF       *PRED      *RESID     *SRESID    *SDRESID      *LEVER      *MAHAL     *COOK D
             -3.0       0.0       3.0


                          * * * * * * * * * * * * * * * * * * * * * * * * * * * * *


RESIDUALS STATISTICS:

                       MIN          MAX      MEAN   STD DEV     N

*PRED             673.9729     789.7438  732.6588   28.5797   255
*ZPRED             -2.0534       1.9974     .0000    1.0000   255
*SEPRED             7.6201      17.4313   10.4747    2.5361   255
*ADJPRED          675.0618     793.6429  732.6771   28.6304   255
*RESID           -435.6506     263.2193     .0000  121.4407   255
*ZRESID            -3.5803       2.1632     .0000     .9980   255
*SRESID            -3.6101       2.1676    -.0001    1.0021   255
*DRESID          -442.9389     264.2998    -.0182  122.4423   255
*SDRESID           -3.6995       2.1837    -.0026    1.0104   255
*MAHAL               .0001       4.2165     .9961    1.0033   255
*COOK D              .0000        .1090     .0041     .0112   255
*LEVER               .0000        .0166     .0039     .0039   255

TOTAL CASES =          265

DURBIN-WATSON TEST =    1.90693
```

OUTLIERS - STANDARDIZED RESIDUAL

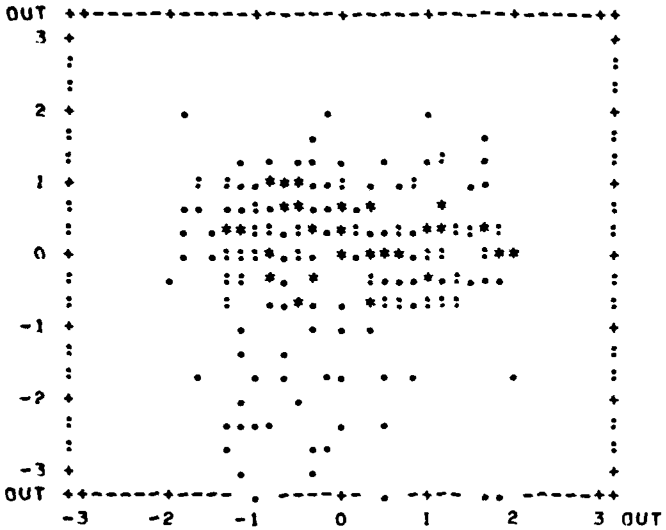
CASE #	*ZRESID
69	-3.58028
251	-3.45676
6	-3.32067
210	-3.23312
5	-2.97785
128	-2.89873
84	-2.62421
241	-2.61956
16	-2.60338
164	-2.48399

```
HISTOGRAM - STANDARDIZED RESIDUAL
 N EXP N       (* = 1 CASES,    . : = NORMAL CURVE)
 0   .28   OUT
 0   .14  3.00
 0   .20  2.88
 0   .29  2.75
 0   .41  2.63
 0   .56  2.50 .
 0   .76  2.38 .
 0  1.01  2.25 .
 1  1.33  2.13 :
 1  1.72  2.00 *.
 1  2.20  1.88 *.
 2  2.75  1.75 **.
 0  3.40  1.63   .
 1  4.13  1.50 *  .
 2  4.94  1.38 **  .
 7  5.82  1.25 *****:*
 8  6.75  1.13 ******:*
 9  7.71  1.00 *******:*
13  8.67   .88 ********:****
12  9.60   .75 *********:**
12 10.46   .63 *********:**
16 11.22   .50 **********:*****
21 11.85   .38 ***********:*********
19 12.32   .25 ***********:*******
21 12.61   .13 ************:********
12 12.71   .00 ************.
19 12.61  -.13 ************:******
 7 12.32  -.25 *******     .
12 11.85  -.38 ************:
12 11.22  -.50 ***********:*
10 10.46  -.63 **********:
 5  9.60  -.75 *****     .
 1  8.67  -.88 *        .
 0  7.71 -1.00         .
 4  6.75 -1.13 ****   .
 2  5.82 -1.25 **    .
 0  4.94 -1.38      .
 2  4.13 -1.50 ** .
 2  3.40 -1.63 **.
 3  2.75 -1.75 **:
 1  2.20 -1.88 *.
 0  1.72 -2.00  .
 3  1.33 -2.13 :**
 2  1.01 -2.25 :*
 1   .76 -2.38 :
 2   .56 -2.50 :*
 3   .41 -2.63 ***
 0   .29 -2.75
 1   .20 -2.88 *
 1   .14 -3.00 *
 4   .28   OUT ****
```

NORMAL PROBABILITY (P-P) PLOT
STANDARDIZED RESIDUAL



STANDARDIZED SCATTERPLOT
ACROSS - *PRED   DOWN - *RESID



SYMBOLS:

	MAX N
.	1.0
:	2.0
*	7.0

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